

## INDEX.

- Acetate of lead, produced, 486; imported, 488.
- Acetate of lime, produced, 401, 435, 512; exported, 437; used as material, 484, 507.
- Acetic acid, produced, 401, 418, 507; establishments and uses, 418, 419.
- Acetone, produced, 402, 482, 507; used as material, 476, 482, 484.
- Acetylene, compression of, 480.
- Acid, sludge, produced, 575, 579, 580.
- Acid furnaces. *See* Open-hearth steel.
- Acid phosphate, used as material, 400, 403, 509.
- Acids, produced, 401; classification, 417; imported, 419; used as material, 451.
- Acids, C. P., produced, 482; defined, 484.
- Acker Process Co., plant, 445.
- Aconite, bark, leaf, and root, imported, 485.
- Adamite. *See* Corundum.
- Africa, exports to, 276, 307, 367.
- Agitators, use in oil refining, 579.
- Agricultural implement industry, statistics of production, 129-153; summaries, 129, 131, 132-134, 136, 142-153; number, kind, and value, by states, 135, 142-153; establishments, 137, 138; patents granted, 139; exports, 139, 140; power used, 139, 621-624; wage-earners and earnings, 651, 652, 716, 724, 732, 748, 776, 778, 782, 786, 790.
- Air, compressed, use in metal working machinery, 234, 235, 638.
- Air, liquid, 482.
- Alabama, rank in iron and steel products, 6, 7, 8, 34, 54, 67, 68.
- Alaska, submarine cable system, 206; discussion relative to industries, wage-earners, and earnings, 707.
- Alcohol, denatured, use in automobile motors, 279; grain and wood, used as material, 400, 463, 507-510; wood, produced, 401; used as material, 484.
- Alcohol varnish, produced, 402, 461, 508, 510.
- Alkaloids, produced, 402, 482, 508.
- Allen, James, cable for war purposes laid by, 206.
- Alternating current, power transmission, 173, 174.
- Alternators, for power transmission, 163.
- Alum, statistics relating to, 428-430; summaries, 428, 507; establishments, by states, 429.
- Alum cake, produced, 429.
- Alumina and bauxite, used as material, 445.
- Aluminum, history, uses, and distribution of plants, 446, 448; production, imports, exports, and consumption, 446.
- Alums, produced, 401, 429; imported, 430.
- Alundum, manufacture and uses, 444, 447.
- Ambulances, 312, 318, 324.
- American Bell Telephone system, telephone cable requirements, 205.
- American Chemical Society, committee on quality of reagents, 484.
- American Iron and Steel Association, report, 54.
- American Railway Association, regulations for transportation of explosives, 473.
- American River Electric Co., plant, 634.
- American Steel Wire Co., record run of blast furnace, 40.
- American Telephone and Telegraph Co., increase in number of stations, 192.
- Ammonia, aqua, used as material, 400, 423, 470, 479, 480, 486, 487, 507, 509; imports, 488; anhydrous, produced, 402, 479, 508; use in artificial refrigeration, 480; C. P., produced, 482; carbonate, muriatic or sal-ammoniac, and sulphate, imports, 488; liquor, used as material, 480, 486; used in coke industry, 523; method of production, 540. *See also* Nitrate of ammonia.
- Ammonia alum, produced, 429.
- Ammonia-soda process, description and establishments using, 422, 423.
- Ammoniated fertilizers, produced, 401.
- Ammoniated super phosphates, produced, 438, 509.
- Ammoniates, used as material, 440, 509.
- Ammonium nitrate, used as material, 473, 480; produced, 486; salts, imports, 526; sulphate, used as material, 400, 440, 480, 507, 509; production and uses, 523, 540.
- Ammunition industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Anchors and chains, iron and steel, 348; wooden, 350, 353.
- Anderson Fertilizer Co., chamber process plant, 411.
- Aniline, colors, used as material, 451; salts, imports, 457.
- Animas Canal Reduction Water Power and Development Co., plant, 634.
- Annunciators and clocks, electric, statistics relating to production and uses, 207, 208.
- Anthracite coal, used as fuel in production of pig iron, 29, 44; tin and terne plate dipping and black plate, combined industry, 89; tin and terne dipping, 91.
- Anthracite coal and culm, used as fuel in iron and steel industry, 12, 28, 43, 52, 71, 74, 80.
- Anthracite furnaces, number and capacity, by states, 38, 39.
- Apatite, imported, 441.
- Arc lamp carbons, 180, 183.
- Arc lamps, value of product, 161; open and inclosed, compared, 180; produced, 181; Bremer, 181, 182; Blondel, 182; magnetite, 182.
- Arc lamps and searchlights, statistics relating to production and uses, 180-183.
- Argentiferous ores, lead smelting, produced, 115, 117, 119; establishments, 117; by states, 118; gross and net values, 120; summary, 121.
- Argentina, exports to, 139, 307.
- Argols, used as material, 400, 487, 507; imports, 488.
- Armor plate and gun forgings, produced, 53, 56; establishments, 56.
- Armour Fertilizer Co., chamber process plant, 411.
- Arsenic, produced, 115, 119.
- Arsenic compounds, imports, 409.
- Artificial feathers and flowers industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Artificial limbs industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Artificial stone industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Artists' materials industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Ash, use in automobile manufacture, 280.
- Asia, exports to, automobiles and automobile parts, 276; steam railroad, passenger, and freight cars and parts, 367.
- Atlanta Water and Electric Power Co., plant, 634.
- Atlantic Coast and Gulf district, shipbuilding operations, 338, 339.
- Atmospheric Products Co., production of nitric acid by electricity, 414.
- Audion receiver, wireless telegraphy, 203, 204.
- Austin, W. W., motor bicycle manufactured, 291.
- Autocoharers or detectors, wireless telegraphy, 203.
- Automatic attachments, metal working machinery, 233-235.
- Automatic multiple-spindle, development and description, 234.

- Automobile bodies and parts. *See* Automobiles.
- Automobiles, statistics relating to manufacture, classes, and power, 168, 268-285; comparative summary, 269; by states, 270; number and value, by class and power, 272, 273; rank of states in production, 273; power, 274; summary for cities, 274; bodies and parts, 275; imports and exports, 275, 277; historical and descriptive, 277, 280; detailed summary, 282-285; built by carriage and wagon manufacturers, 304, 314, 320, 326; establishments, wage-earners, and earnings, 716, 724, 732.
- Automobiles, hydrocarbon, magneto-ignition apparatus used, 215, 216.
- Awnings, tents, and sails industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Axle grease industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Axles and springs, used in manufacture of carriages and wagons, 304, 310.
- Babbitt metal and solder industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Baekeland, Dr. L. H., on manufacture of alkaline hydropides and chlorine, 449.
- Bag industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Baking and yeast powder industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Barb wire. *See* Wire and wire products.
- Barges, launched by private shipyards, 338, 339; statistics relating to, 340, 341; iron and steel, and wooden, 340; number, tonnage, and value, by states, 341.
- Barium dioxide, used as material, 442.
- Bark, used as material, 511.
- Barker, George F., crude petroleum, fractional distillation, 578.
- Barks and extracts, exports, for tanning, 460; medicinal, imports, 485.
- Bars and rods, produced, 53, 54.
- Bartlett, E. O., process for manufacturing sublimed white lead, 464.
- Barytes, natural and artificial, used as material, 463; how obtained, 465; summary, 508, 510.
- Base bullion, used as material, lead refining, 115, 116, 119, 121; lead contents, 118.
- Basic furnaces. *See* Open-hearth steel.
- Basic open-hearth steel, used as material, domestic black plates, 89, 91; tin and terne plate, by states, 97.
- Basic pig iron, establishments and quantity, by states, 32, 74; blast furnaces, 74.
- Basic steel ingots and castings, quantity and value, by states, 66, 67.
- Basin and Plateau division, discussion relative to industries, wage-earners, and earnings, 703-705. *See also* Geographic divisions.
- Baskets, and rattan and willowware industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Bath Iron Works, steel battle ships built by, 337.
- Batteries, storage and primary, value of product, 176; discussion relating to production and use, 176-179.
- Bauxite, imported for consumption, 430; deposits, 446; uses, 447; used as material, 507.
- Bean pullers, 137, 144, 150.
- Bean separators, 136, 144, 150.
- Beehive ovens. *See* Ovens.
- Beet sugar, rank of Pacific division in production, 705.
- Beet sugar industry, establishments, wage-earners, and earnings, 649, 716, 724, 732.
- Beilby, George, report on the cyanide industry in Europe, 434.
- Belgian ovens. *See* Ovens.
- Bell telephone system, exchange service furnished by, 192; number of exchanges, miles of wire, number of employees, and daily average of exchange connections, 193; copper wire in use by, 204.
- Bells industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Belting and hose industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Belton Power Company, plant, 634.
- Benz, Carl, application of gas engines to road vehicles, 277.
- Benzine, distillation from coal tar, 432; used as material, 463; deodorized, uses of, 580.
- Bermuda, exports of automobiles and automobile parts to, 276.
- Besegés, France, Siemens or Simon-Carvés oven operated, 534.
- Bessemer converters, number and capacity, by states, 64; summary, 82.
- Bessemer pig iron, malleable, definition, 31; establishments and production, by states, 32, 74.
- Bessemer steel, rails and structural shapes, 52, 54; black plates, 53, 55, 56; ingots, 63; castings, 64. *See also* Black plates.
- Bessemer steel converters, establishments and capacity, 14, 15, 61, 80; ingots and castings, by states, 63, 64; discussion relative to production, 64, 65.
- Bessemer steel works, number, equipment, and capacity of establishments, and quantity and value of ingots and castings, by states, 64.
- Betts, Anson G., electric conductor constructed by, 449, 450.
- Biborate of soda (borax), produced, 401.
- Bicarbonate of soda, produced, 401, 421; summary, 507.
- Bichromate of soda, imported, 488.
- Bicycle and tricycle industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Bicycles and tricycles, section by Robert H. Merriam, 289-297; growth and decline of industry, 289; products, 289; comparative summaries, 289, 291; active establishments, by states, 290; value of exports, 291.
- Bicycles, motor, first use in United States, 291; Copeland steam, description, 292; number and value, 289, 290.
- Billiard table and materials industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Birkeland and Eyde, process for nitric acid extraction, devised by, 414.
- Bisulphites, produced as bleaching materials, 441.
- Bituminous coal, used as material, 89, 91.
- Bituminous coal and slack, used as fuel in iron and steel industry, 12, 28, 43, 52, 71, 74, 80; in black plate industry, 95.
- Black plate industry, comparative summary and statistics of establishments, 87, 88, 94, 95; products, by states, 95; materials used, 95.
- Black plates, for tinning, produced, 53, 55; establishments reporting, 55, 56; domestic and foreign, used as material, 89, 91; production, 94; by states, 95, 96; summary, 97.
- Blacking industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Blanc fixe, how obtained, 465.
- Blast furnaces, charcoal, comparative summary, 46; capital, 47; materials used, 47; pig iron produced, 48; number completed, 48.
- Blast furnaces, mineral fuel, statistics, 41-45; pig iron produced, 44; establishments and value per ton, 45.
- Blast furnaces, products, 3, 14, 21, 29-36; capital, 8, 10, 28; wage-earners, 11, 25; fuel, 12; materials used, 13, 28, 29; establishments, 14, 26, 28, 37; comparative summary, by geographic divisions, 16, 19; capital and products, 20; statistics concerning production of pig iron, 24-48; earnings, comparative summaries, 25, 27; production per wage-earner, 25, 41; products, classified according to kind of fuel used, 29; equipment and production, 36-40; according to kind of fuel used, by states, 38, 39; average daily capacity, 39; power, 40, 41, 621-624, 628; detailed summary, 72, 83; earnings of wage-earners, 651, 662, 666, 758, 774, 786, 788, 790.
- Blasting powder, produced, 468, 509.
- Blauvelt, on designers of ovens, 534.
- Bleach, high-grade, production by Niagara plant, 449.
- Bleaching materials, produced, 402, 441, 442, 507; discussion of statistics, 441-443; components, 442; establishments, 442.
- Bleaching powder, Hasenclever on world's production, 442; used as material, 442; produced by Germany, 442, 443.
- Blister, German, and miscellaneous steel furnaces, establishments, 80-82.
- Blister or anodes used as material, 105, 107, 108, 110; establishments reporting, states and territories, 106; summary, 112.
- Block signals, operation, by electro-pneumatic process, 481.
- Blooms, used as material in iron and steel shipbuilding, 348; wooden ship and boat building, 350-353.
- Blooms, billets, etc., produced in forges and bloomeries, 71.

- Blooms and bar iron, production, 71.
- Blue vitriol, quantity of copper contents, 103; produced in copper refining, 105, 107; used as material, 107, 110; establishments, 108, 111; by states and territories, 109; summary, 113; produced in lead smelting, 115, 508; imports, 489.
- Bluing industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Boats, small, under 5 tons, statistics of, 333-335; motor, growth of industry, 333; canal, launched by private shipyards, 338, 339.
- Boiler and other plates and sheets, produced, 53, 55; states reporting, 55.
- Bolivia, ores, reexported to, 122.
- Bolt, nut and pipe threading and tapping machines, produced, 227, 229.
- Bolt headers, for forging hot metal, 230.
- Bolts, nuts, forged spikes, washers, etc., statistics of, 59, 60; establishments, wage-earners, and earnings, 718, 726, 736.
- Bone, ivory, and lamp black, summary, 507; establishments, wage-earners, and earnings, 716, 724, 732.
- Bone and boneblack, used as material, 487.
- Bone dust, imported for consumption, 441.
- Bones, used as material, 507.
- Bones, tankage, and offal, used as material, 400, 440, 509.
- Bookbinding and blank book making industry, establishments, wage-earners, and earnings, 716, 724, 732, 784.
- Boosters, dynamotors, and motor generators, states reporting, 166.
- Boot and shoe cut stock, findings and uppers, establishments, wage-earners, and earnings, 716, 724, 732.
- Boot and shoe industry, power employed, 621-623; change in process of manufacture, 624, 625; wage-earners and earnings, 651, 716, 724, 732; discussion of industry, 654-656; establishments, wage-earners, and earnings, by states, territories, and geographic divisions, 748, 749; in specified states, 774, 775, 780-791; rubber, 774, 780.
- Boracic acid, imports consumed, 419.
- Borates of lime or soda, imported for consumption, 425.
- Borax industry, development and processes of production, 424, 425; imports, 425; production, 507.
- Boring and drilling machinery, products, 227, 228; rank of specified states in manufacture, 228.
- Boring and turning mills, or vertical lathes, produced, 227, 229.
- Bornite, formula, 407; as a sulphuric acid producer, 408.
- Boston, Mass., rank in piano manufacture, 243; pipe organs, 246; navy yard, steel training bark built at, 337.
- Bowker Fertilizer Co., chamber process plant, 411.
- Box cars, built for freight service, 366.
- Box industry, cigar, fancy and paper, wooden packing, establishments, wage-earners, and earnings, 716, 724, 732; fancy and paper, in specified states, 784.
- Boxes and nails, used as material, 89, 91, 97.
- Bradley, aluminum patent granted, 446.
- Bradley and Lovejoy, patents granted, 414.
- Brakes, four-wheeled, 312, 318, 324.
- Brantley, A. P., Sons and Co., chamber process plant, 411.
- Brass, castings, and finishing, industries, establishments, wage-earners, and earnings, 716, 724, 732.
- Brass and copper, rolled, industry, establishments, wage-earners, and earnings, 716, 724, 732; in specified states, 774.
- Brassware, industry, establishments, wage-earners, and earnings, 716, 724, 732; in specified states, 774.
- Brayton engine, kerosene first employed in, 572.
- Bread and other bakery products, industry, establishments, wage-earners, and earnings, 716, 724, 732; in specified states, 774-776, 780-788.
- Bremer, Hugo, description of arc lamp introduced by, 181.
- Brick and tile industry, establishments, wage-earners, and earnings, 716, 724, 732; in specified states, 776-778, 784-790.
- Brine, used as material, 487.
- British Australasia, exports to, 139.
- British Columbia, ores imported for consumption and reexported to, 122.
- Bromides, produced, 482.
- Bromine, imports consumed, 485.
- Bronze casting industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Brooklyn, N. Y., navy yard, battleship built at, 337.
- Brooms and brushes industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Broughams, 312, 318, 324.
- Buckboards, 312, 318, 324.
- Buffalo, N. Y., statistics of automobile manufacture, 274.
- Buggies, 312, 318, 324.
- Bureau of Engraving and Printing, mercury vapor lamps in use, 188.
- Bureau of Standards, established for chemical tests, and instrument standardization, 485.
- Burnt alum, produced, 429.
- Bussey and Sons, chamber process plant, 411.
- Butter, and butter reworking, industries, establishments, wage-earners, and earnings, 716, 724, 732.
- Button industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Cables, underground, for electric lighting and power work, 204; insulation, materials used, 205, 206.
- Cabooses, steam railroad, 366.
- Cabriolets, 312, 318, 324.
- Cabs, 312, 318, 324.
- Cahill, Dr. Thaddeus, telephonic system of music production, 198.
- Calcedine magnesite, produced, 479.
- Calcium carbide, production and uses, 445-448.
- Calcium chloride, produced, 486, 487.
- Calcium cyanide, manufacture, 434.
- Calcium light industry, establishments, wage-earners, and earnings, 716, 724, 732.
- California Gas and Electric Co., plant, 634.
- Calomel, imported, 485.
- Cambridge, Mass., rank in manufacture of piano materials, 250, 251.
- Camphor, produced, 476, 482, 484; imported, 488.
- Camwood, imported, 457.
- Canada, exports to, 139, 276.
- Canadian Commission, report on electric smelting of iron ore, 23, 24.
- Canadian Niagara Falls Power Co., plant, 631, 634.
- Canal boats, statistics, 341.
- Candle industry, establishments, wage-earners, and earnings, 716, 724.
- Cane mills, 137, 144, 150.
- Canning and preserving industry, oysters, 649, 716, 724, 732; fish, 716, 724, 732; fruit, 716, 724, 732, 774, 780, 784.
- Capital, amount invested in specified industries, iron and steel, 4-6, 8-10, 16, 18-20; blast furnace, 25, 27, 28, 41-43, 46, 47, 72, 76; steel works and rolling mills, 49-50, 76, 82; forges and bloomeries, 70; tin andterne plate industry, 87-91, 94-97; copper, lead, and zinc, smelting and refining, 101, 103, 105, 107, 110, 112-115, 119, 121-125; agricultural implements, 129, 131-132, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 273, 275, 282; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-303, 307, 310, 316, 322; shipbuilding industry, 331, 332, 334, 335, 348, 350, 352; steam and street railroad car industry, 357, 358, 364, 365, 367, 368, 370, 371, 374, 378, 382, 389, 390; chemicals and allied products, 398, 399; acids, 404, 407, 504; sodas, 421; alums, 428; coal tar products, 430; cyanides, 432; wood distillation, 435, 505; fertilizers, 438, 494; bleaching materials, 441; electrochemicals, 444; dyestuffs, 450, 502; tanning materials, 458; paints and varnishes, 461, 463, 492, 500; explosives, 468, 470, 498; plastics, 475, 476; essential oils, 477, 506; gases, compressed and liquefied, 479; chemicals, 482, 486, 490; bone, ivory, and lampblack, 507; coke, 515, 516, 522, 528; petroleum refining, 567, 568, 575.
- Car, steam and street railroad, industry, statistics, 355-393, 716, 724, 732, 774, 790.
- Car axles, produced, 53, 55.
- Caravans, 312, 318, 324.
- Carbon dioxide, produced, 402, 479, 480, 481, 508.
- Carbon tetrachloride, properties and uses, 448, 449.
- Carbonate of potassium, used as material, 480.
- Carbons, statistics of production, classes and uses, 161, 179, 180, 445.
- Carborundum, statistics, 444-448.

- Carborundum Co., current supplied to, 445.
- Card cutting and designing industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Carnegie Steel Co., dry-air blast furnaces, 40, 45.
- Carpet and rug industry (other than rag), establishments, wage-earners, and earnings, 716, 724, 732, 780, 788.
- Carpets, rag, industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Carriage and wagon industry, scope of report, 301; establishments, wage-earners, and earnings, 301, 310, 316, 322, 651, 716, 724, 732, 750, 778, 782, 784-786; materials used, 301, 303, 307, 310, 316, 322, 327, 716, 724, 732; exports and imports, 307; production, 304-307, 312, 314, 318, 324.
- Carriage bodies, used as material, 304.
- Carriage hardware, lamps, and mountings, 304.
- Carriages and sleds, children's, industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Cars, two-wheeled, pleasure, 312, 318, 324; steam railroad, establishments, wage-earners, and earnings, 357, 358, 364, 365, 371, 372, 716, 724, 732; construction and repairs, 359, 362, 367, 374-385, 774, 776, 782, 790; exported, 367; street railroad, classification, establishments, wage-earners, and earnings, 386, 716, 724, 732; construction and repairs, 387, 388, 390-393.
- Carts, agricultural, 137, 144, 150; pleasure, 312, 318, 324.
- Casein, use in plastics, 477.
- Cash register and calculating machine industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Casting machines, 35.
- Castings. *See* Direct castings.
- Cataract Power and Conduit Co., plant, 634.
- Caustic potash, method of manufacture and uses, 427.
- Caustic soda, produced, 401, 421, 507, 575; imported, 425; used as material, 442, 451, 484.
- Celery hillers, 136, 144, 150.
- Cellarius jar, use, 418.
- Celluloid, 476.
- Cellulose, uses, 184, 476, 477; nitrate, per cent in dynamite, 472.
- Cement industry, 628; establishments, wage-earners, and earnings, 716, 724, 732.
- Central America, automobile exports to, 276.
- Central station, electric measuring instruments, 213, 214.
- Chalcocite, formula, 407, 408.
- Chalcopyrite, formula, 407, 408.
- Chamber process for utilizing sulphur gases, 409; plants, 411.
- Charcoal, used as fuel, 12, 28, 47, 52, 71, 74, 80, 89, 91, 95, 403; used as material, 401, 435, 436, 470, 509; imported, 437.
- Charcoal industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Charcoal pig iron, 46-48, 72-77.
- Check rowers, 137, 144, 150.
- Cheese industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Chemical products, 401-406, 415-419, 421-423, 426, 428-433, 435-439, 441, 442, 444, 446, 451, 458, 461, 462, 468, 469-471, 475, 477-479, 482, 483, 486, 487, 490.
- Chemicals, exported and imported, 407, 419, 425, 428, 430, 434, 437, 441, 446, 450, 457, 460, 468, 475, 477, 478, 485, 488.
- Chemicals and allied products, report, 397-512; scope of census and classes, 397, 398; establishments, wage-earners, and earnings, 398, 399, 404, 417, 421, 428, 430, 432, 435, 438, 439, 441, 444, 450, 458, 461, 468, 475, 477, 479, 482, 486, 490-507, 716, 724, 732, 782-784; by industries, 397, 398; used as material, 411, 440, 442, 446, 451, 456, 507, 508.
- Chicago, Ill., rank in manufacture of musical instruments, 243, 246, automobiles, 274.
- Children. *See* Wage-earners and wages and Earnings of wage-earners.
- China decorating industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Chloral hydrate, imported, 485.
- Chlorate of potash, used as material, 480.
- Chloride, sulphur, uses, 450.
- Chloride of lime, imported, 433.
- Chloride of potassium, used as material, 509.
- Chlorine, used as material, 441.
- Chloroform, produced, 402, 482, 484, 508; imported, 485.
- Chocolate and cocoa products industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Chrome tannage solution, 511.
- Chronic and lactic acid, imported, 419.
- Cinchona bark salts, imported, 485.
- Cinchonidia, imported, 485.
- Cincinnati, Ohio, rank in manufacture of metal working machinery, 226.
- Circuit fittings, statistics, 214, 215.
- Cities, specified, statistics of establishments manufacturing agricultural implements, 134; automobiles, 274; rank in carriage and wagon industry, 304.
- Citric acid, imported, 419.
- Cleansing and polishing preparations industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Cleveland, Ohio, rank in manufacture of metal working machinery, 226; automobile statistics, 274.
- Clock industry, establishments, wage-earners, and earnings, 716, 724, 732, 774. *See also* Electric clocks and time mechanisms.
- Cloth sponging and refinishing industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Clothing industry, men's, establishments, wage-earners, and earnings, 651, 716, 724, 734, 750, 776, 790; women's, establishments, wage-earners, and earnings, 651, 716, 724, 734, 752, 776, 780, 784-788; horse, establishments, wage-earners, and earnings, 716, 724, 734.
- Clover hullers, 136, 144, 150.
- Coaches, hotel, 312, 318, 324.
- Coal, yield in coke, 518, 519, 521. *See also* Anthracite coal, Bituminous coal, and Coke.
- Coal and coke, used as material, 445.
- Coal and coke cars, built, 366.
- Coal tar, products, 401, 432, 451, 507-511, 523-525, 530, 541; establishments, wage-earners, and wages, 430; exports and imports, 432, 457, 525; used as material, 451-455, 508, 510, 511; colors, foreign use of, 452; industry, development of, in Germany and the United States, 453-455.
- Coal wagons and carts, 312, 318, 324.
- Cochineal, imported, 457.
- Coe, E. Frank, and Co., chamber process plant, 411.
- Coffee and spice roasting and grinding industry, establishments, wage-earners, and earnings, 716, 724, 734.
- Coffins, burial cases, and undertaker's goods industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Coke, industry, discussion relative to, 513-541; establishments, wage-earners, and earnings, 515, 516, 528, 716, 724, 734, 774, 788; produced, 518, 519, 520, 521, 524, 540; by-products, 523-525, 534; exports and imports, 525, 540; distribution, 532, 533; manufacture, 533-541; uses, 539, 540; patents, 545-563.
- Coke and black naphtha, produced, 575.
- Coke ovens. *See* Ovens.
- Collar and cuff industry, establishments, wage-earners, and earnings, 716, 724, 734, 784.
- Collodium, 507, 508, 510.
- Columbia Chemical Co., ammonia-soda process, 422, 423.
- Columbia Improvement Co., plant, 634.
- Comb industry, establishments, wage-earners, and earnings, 716, 724, 734.
- Condensed milk industry, establishments, wage-earners, and earnings, 716, 724, 734.
- Condor Water and Power Co., plant, 634.
- Conduits, electric, value, 206; uses, 206, 207.
- Confectionery industry, establishments, wage-earners, and earnings, 718, 726, 734, 784.
- Connecticut, rank in iron and steel industry, 7, 8; manufacture of electric clocks, etc., 208; metal working machinery, 227; number marine railways, 345.
- Contact process, use in manufacture sulphuric acid, 409; plants, 410.
- Converters, establishments using, 61, 64, 65, 80-82; synchronous, description and uses, 166.
- Cooper-Hewitt, Peter, development of mercury vapor lamps, 188.
- Cooperage industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Copeland, W. E., steam motor used by, 277.
- Copeland, W. E. and L. D., "Copeland steam bicycle" invented by, 292.
- Coppée oven. *See* Ovens.
- Copper, lead, and zinc smelting and refining, section on, by Story B. Ladd, 99-126;

- comparative summary, 101; products, 101-103.
- Copper, sheets and pipe, used as material, 348, 350-353; sulphate, 489.
- Copper oxide battery, 178, 179.
- Copper smelting and refining, products, 60, 101-113; statistics, 101-113; establishments, wage-earners, and earnings, 103, 105-108, 110-113.
- Copperas, produced, 486, 508; imports, 488; uses, 488.
- Coppersmithing and sheet iron working industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Cordage, wire, Manila, and hemp, used as material, 348, 350-353.
- Cordage and twine industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Cordial and sirup industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Cork cutting industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Corn cleaners, hooks, huskers, knives, and shellers, 136, 137, 144, 150.
- Corset industry, establishments, wage-earners, and earnings, 649, 718, 726, 734, 774.
- Corundum, forms, 444, 447.
- Cotton, used as material, 470, 476, 507.
- Cotton gins, presses, scrapers, and sweeps, 136, 137, 144, 150.
- Cotton goods industry, power used, 620-624; establishments, wage-earners, and earnings, 651, 656-659, 718, 726, 734, 752, 774-780, 784-790.
- Cotton small wares industry, establishments, wage-earners, and earnings, 718, 726, 734, 788.
- Cotton waste industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Cottonseed, meal and oil, used as material, 400, 440, 508, 509, 510.
- Coupes, 312, 318, 324.
- Courtis, William M., discussion of potassium salt deposits, 426, 427.
- Cramp, William, & Sons, cruisers built, 337.
- Cream of tartar. *See* Tartar, cream.
- Crocker, Prof. F. B., on primary batteries, 179.
- Crucible, steel ingots and castings, 62; ingots, 63; castings, 64.
- Crucibles industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Cryolite, imported, 423, 430.
- Cudbear, imported, 457.
- Cultivators, 135, 136, 142, 148.
- Cushman, Dr. Allerton S., patent granted, 427.
- Cut nail industry, decline, 58, 59.
- Cut nails. *See* Nails.
- Cutch, used as material, 451.
- Cutlery and edge tools industry, establishments, wage-earners, and earnings, 718, 726, 734, 774.
- Cyanides, produced, 401, 432-434, 507; imported, 434.
- Cypress, use in automobile manufacture, 280.
- Daimler, Gottlieb, application of gas engines to road vehicles, 277; bicycles, 292.
- Dairymen's, poulterers', and apiarists' supplies industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Dayton and Northern Traction Co., use of storage battery for interurban work, 177.
- Decker, F. A., primary battery, 179.
- De Forest, Dr. Lee, wireless telegraph detector, 203.
- Delany, rapid telegraph system, 201.
- De Laval, steam turbine, 628.
- Delivery wagons, 312, 318, 324.
- Dempwolf, C. H. and Co., chamber process plant, 411.
- Denitrator, use of, in treatment of spent acids, 472.
- Dentists' materials industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Depew, C. M., quoted as to growth of the dyestuff industry, 452.
- de Rochas, M. Beau, internal-combustion engine, 278.
- Detroit, Mich., statistics of automobile manufacture, 274.
- Detroit Chemical Co., chamber process plant, 411.
- Development and Funding Co., electrolytic alkali works, 449.
- Dewey dry dock, capacity, 345.
- Dextrin, burnt starch, gum substitute or British gum, imports, 457.
- Dining and buffet cars, built, 366.
- Dioxides, development, 443.
- Direct castings, produced, iron, 29, 35; by states, 30, 33, 36, 74; steel, produced, 53, 56; by states, 61-64, 66, 67, 69, 80.
- Direct current dynamos. *See* Dynamos.
- Disk and cylinder records, phonograph and graphophone, value, 264.
- Disston, Henry, and Sons, installation of electric induction steel furnace, 22.
- Distillery products, coal tar, value, 401.
- Docks, dry. *See* Dry docks.
- Doctor's wagon or car, automobile, 314, 320, 326.
- Dominion of Canada, carriage and wagon exports to, 307.
- Door and shutter, iron and steel, industry, establishments, wage-earners, and earnings, 718, 726, 736.
- Doré bars and fine bars, lead refining, used as material, 115, 117, 119, 121; contents, 118.
- Double current generators, description and uses, 167.
- Drays, 312, 318, 324.
- Drills, agricultural, 136, 142, 148.
- Drinker, Henry S., member of committee on transportation, 473.
- Driving wagons, 312, 318, 324.
- Drug grinding industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Druggists' preparations industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Drugs, crude, used as material, 484.
- Dry-air blast, advantages, 45; gas analyses, 46.
- Dry color pigments, produced, 402.
- Dry colors, used as materials, 400, 463; produced, 461, 508, 510; definition of term and uses, 466.
- Dry docks, number and kind, by states and geographic divisions, 344; by naval stations, 345.
- Dryers, japans and liquid, preparation, 467.
- Drying japans and dryers consumed, 508, 510.
- Dudley, Stanton, quoted in regard to production of zinc white, 465.
- Dump dirt wagons and carts, 312, 318, 324.
- Dunn, Maj. B. W., chief inspector of explosives, 475.
- Dunwoody, H. H. C., carborundum detector, 448.
- Dupont Powder Co., contact process plant, 410.
- Duryea, Charles E. and J. F., gasoline automobile constructed by, 278.
- Duryea Motor Wagon Co., operations, 278.
- Dutch process of white lead manufacturing, 463.
- Dyeing and finishing textiles industry, establishments, wage-earners, and earnings, 634, 718, 726; classified weekly earnings, 780, 784, 788.
- Dyes, alizarin, imports, 457.
- Dyestuffs, statistics relating to classes, production, and consumption, 402, 450-457; comparative summary, 450; establishments and products, 451; materials used, 451; imports, 457; detailed summary, 511.
- Dyestuffs and colors, produced, 476.
- Dyestuffs and extracts, comparative summary, 398; detailed summary, 511; establishments, wage-earners, and earnings, 718, 726, 734.
- Dyewoods, imports, 457. *See also* Dyestuffs.
- Dynamite, produced, 402, 468, 471; composition, 472, 509.
- Dynamo and motor supplies, 216.
- Dynamo art, revolution of, 162.
- Dynamos, statistics relating to production, 161-166; number, horsepower, and value, specified states, 161; alternating current, types and uses, 162-166; direct current, value in electro-chemical processes, 162; modifications in manufacture, 163.
- Dynamotors. *See* Motor generators, dynamotors, and boosters.
- Earnings of wage-earners, all industries, 716-741; states, territories, and geographic divisions, 742-747, 774-791; twenty-five selected industries, 748-773.
- East Indies, carriage and wagon exports to, 307.
- Eastern North Central division, discussion relative to industries, wage-earners, and earnings, 690-693. *See also* Geographic divisions.
- Eastern South Central division, discussion relative to industries, wage-earners, and



- earnings, 697-699. *See also* Geographic divisions.
- Edison, T. A., storage battery invented by, 177, 178.
- Edison Co., Chicago, turbo-generator built by, 165; installation of double current generators, 167; New York, electrical control equipment installed, 175, 176; extensive use of storage batteries, 177; tantalum lamps in use by, 185.
- Edison copper oxide battery, 178, 179.
- Edison Electric Co., plant, 634.
- Electric annunciators. *See* Annunciators and clocks, electric.
- Electric clocks and time mechanisms, 208.
- Electric conduits, excluded from report, 157; interior, classes described, 207. *See also* Conduits, electric.
- Electric cooking apparatus, adopted by hotels, 210, 211.
- Electric custom work and repairing, 217; deterioration of industry, 217.
- Electric Development Co., plant, 634.
- Electric furnaces, future use in iron and steel industry, 22; types, 23, 24; advantages, for production of ferroalloys and crucible and high-grade steels, 24; induction for commercial operation, 24; production of nitric acid, 414.
- Electric heating apparatus, statistics relating to production, cost of operation, advantages, and use, 210, 211.
- Electric horsepower. *See* Horsepower.
- Electric light fixtures, statistics, 190, 191; value of product, 190; improvements in design and character, 191.
- Electric measuring instruments, produced, 213, 214.
- Electric meters, for consumers' circuits, 213; establishments, 213; states producing, 214. *See also* Watt-hour meters.
- Electric motors, distribution of power, 167; in industrial establishments, by classes, 169; summary, 619, 620. *See also* Motors, electric.
- Electric railways, statistics relating to motors used, 167, 168; development of motor industry in connection, 170, 171; use of storage battery equipment, 177.
- Electric signs, value and growth of industry, 217.
- Electric smelting, iron ore, report of Canadian commission, 23, 24.
- Electric Smelting and Aluminum Co., production of ferroalloys, 22.
- Electric street cars, built, 366.
- Electric street signs, effect on production of incandescent lamps, 184.
- Electric switches, signals, and attachments, value and functions, 215.
- Electric testing and scientific instruments, statistics, establishments, production, and value, 213, 214; growth of industry, 214.
- Electric welding apparatus, development and use, 211.
- Electrical Development Co., vertical turbines used, 631.
- Electrical Lead Reduction Co., manufacture of electro-chemicals, 445.
- Electrical machinery, apparatus, and supplies, 157-221; first complete record, 157; supplies, not including porcelain, 157; growth of industries, 157, 158; summaries, 158, 159, 218; household goods, miscellaneous, 210, 211; novelties and toys, 216, 217; transmission plants, 634; wage-earners and earnings, 651, 718, 726, 734; by states, territories, and geographic divisions, 754; by specified states, 776, 780, 784-788.
- Electricity, importance in medicine and surgery, 216; factor in development of speed-changing devices, 233; distribution from Niagara Falls, 445.
- Electro Metallurgical Co., production of ferroalloys, 23.
- Electro-chemicals, products included, 444; process of production and distribution of establishments, 444, 450; summary, 507.
- Electro-therapeutic apparatus, value, 215; establishments and states producing, 216.
- Electrochemical and Metallurgical Industry, extract from, 24.
- Electrolytic copper refining process, development, 162.
- Electroplating, use of direct current dynamos in, 162; industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Electrothermic metallurgy of iron and steel, 22-24.
- Elevators, electric, 167, 168.
- Elkington, James, first electrolytic copper refining by, 162.
- Emery-wheel industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Enamel, rubber, and other carriage cloth, used as material, 304.
- Enameling and enameled goods industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Engines, gas and gasoline, number and horsepower, 619, 620; use, and development of manufacture, 635-637; gas blast furnace, utilization of, 637; steam, number and horsepower, 619, 620.
- Engines and boilers, agricultural, 137, 144, 150.
- Engravers' materials, industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Engraving, steel, including plate printing, industry, establishments, wage-earners, and earnings, 718, 726, 734; establishments, wage-earners, and earnings, 649, 718, 726, 734.
- Ensilage cutters, 137, 144, 150.
- Envelope industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Epsom salts, produced, 402, 479, 486, 508; imports, 488.
- Equalizers, 137, 144, 150.
- Essential oils, summaries, 398, 477, 512; produced, 402, 477; used as material, 478.
- Establishments, number in specified industries, iron and steel, 4-6, 8-10, 14, 16, 18, 19; blast furnace, 25, 27, 28, 32-33, 35-37, 41-43, 46, 47, 72, 76; steel works and rolling mills, 49-51, 58, 61, 64, 66-69, 76, 82; forges and bloomeries, 70; tin andterne plate, 87-91, 93-97; copper, lead, and zinc smelting and refining, 101, 103, 105-108, 110-115, 117, 119-125; agricultural implements, 129, 131-132, 137, 138, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 273, 275, 282; bicycles and tricycles, 289-291, 294; carriages and wagons, 301-303, 307, 310, 316, 322; shipbuilding, 331, 332, 334, 335, 347, 348, 350, 352; steam and street railroad car, 357-359, 364, 365, 367, 368, 371, 374, 378, 382, 386-390; chemicals and allied products, 398, 399; acids, 404, 405, 412, 415, 417-419, 504; sodas, 421, 422; alums, 428, 429; coal tar products, 430, 431; cyanides, 432, 433; wood distillation, 435, 436, 505; fertilizers, 438, 439, 494; bleaching materials, 441, 442; electro-chemicals, 444; dyestuffs, 450, 451, 502; tanning materials, 458; paints and varnishes, 461, 462, 492, 500; explosives, 468, 469, 498; plastics, 475, 476; essential oils, 477, 478, 506; compressed and liquefied gases, 479; chemicals, 482, 483, 486, 487, 490; bone, ivory, and lamp black, 507; coke, 515, 516, 522, 528; petroleum refining, 567, 568, 574; power employed, 619, 620.
- Esters, produced, 482.
- Ether, produced, 402, 482, 484, 508; consumed in establishments where manufactured, 403, 485, 508, 509; used as material, 470, 476; patent granted P. Fritzsche, 484; nitrous spirits, imports consumed, 485; petroleum, use, 580.
- Europe, exports to, automobiles and automobile parts, 276; carriages and wagons, and parts, 307; steam railroad, passenger, and freight cars, and parts, 367.
- Expenses, miscellaneous, in specified industries, iron and steel, 4-6, 16, 18, 19; blast furnaces, 25, 27, 41, 42, 46, 72; steel works and rolling mills, 49-50, 78; forges and bloomeries, 70; tin andterne plate, 87, 90, 91, 94-96; copper, lead, and zinc smelting and refining, 101, 103, 105, 107, 108, 110-115, 119, 121-124, 126; agricultural implements, 129, 131, 132, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 273, 275, 282; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-303, 307, 310, 316, 322; shipbuilding, 331, 332, 335, 348, 350, 352; steam and street railroad cars, 357, 358, 364, 365, 367-371, 374, 378, 382, 386, 388-390; chemicals and allied products, 398, 399; acids, 404, 417, 504; sodas, 421; alums, 428; coal tar products, 430; cyanides, 432; wood distillation, 435, 505; fertilizers, 438, 496; bleaching materials, 441; electro-chemicals, 444; dyestuffs and extracts, 450, 502; tanning materials, 458;

- paints and varnishes, 461, 463, 492-495, 500; explosives, 468, 470, 498; plastics, 475, 476; essential oils, 477, 506; compressed and liquefied gases, 479; chemicals, 482, 486, 490; bone, ivory, and lamp black, 507; coke, 515, 528; petroleum refining, 567, 575.
- Explosives, summaries, 398, 468, 470, 498, 509; increase, 399; produced, 402, 468, 469; statistics relating to classes, production, and uses, 468-475; establishments, 469; used as material, 470; transportation of, 473-475; imports and domestic exports, 475.
- Explosives industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Exports, tin plate, terne plate, and taggers tin, 92; agricultural implements, 130; metal working machinery, 226; musical instruments, attachments, etc., 242; care observed in shipping, 242; value, compared with value of domestic production, 242; automobiles, 276; bicycles, 291; carriages and wagons, 307; steam railroad passenger and freight cars, 367; wood distillation products, 437; aluminum, 446; tanning materials, 460; paints, pigments, colors, etc., 468; explosives, 475; pyroxylin plastics, 477; oils, 478; coke, coal tar, crude and pitch, 525; petroleum, 573.
- Express wagons, 312, 318, 324.
- Extracts, tanning material, produced, 402.
- Falding, F. J., sulphuric acid plants and processes, 410; on consumption of sulphuric acid in iron and steel industry, 411.
- Fancy articles industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fanning mills, 136, 144, 150.
- Faraday, —, benzine discovered by, 481.
- Farm trucks, 137, 144, 150.
- Farm wagons, 312, 318, 324.
- Fats, used as material, 451.
- Federal building, Chicago, electric lighting fixtures, 191.
- Federal Chemical Co., chamber process plant, 411.
- Feldspar, 426, 427.
- Felt goods industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fencing, field, 59.
- Ferroalloys, 22, 23.
- Ferrocyanide, 401.
- Ferromanganese, 30, 33, 74.
- Ferrophosphorus, 30.
- Ferrosilicon, 33, 34, 74.
- Ferrotitanium works, 23.
- Ferrovanadium works, 23.
- Fertilizers, comparative summaries, 398, 438; produced, 438, 439, 509; discussion, 437-441; establishments, 438, 718; materials used, 440; imports, 441; detailed summary, 509; wage-earners and earnings, 718, 726, 734, 776, 788, 790.
- Fessenden, Prof. R. A., inventor wireless telegraph detector, 203.
- Fifth International Congress of Applied Chemistry, report on cyanide industry, 434.
- Files industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fillers, paint and varnish, 467, 508, 510.
- Fine chemicals, produced, 402, 482, 508; establishments, 483; used as material, 484; imports, 485.
- Fine color pigments, produced, 402.
- Fine colors, produced, 461, 508.
- Firearms industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fire extinguishers industry (chemical), establishments, wage-earners, and earnings, 718, 726, 734.
- Fire patrol wagons, 312, 318, 324.
- Fireworks industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fish, used as material, 400, 440, 509.
- Flags and banners industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Flaming, or luminous arc lamps. *See* Arc lamps.
- Flash point, minimum for United States Army, 581.
- Flat cars, steam and street railroad, 366.
- Flat irons and curling irons, electric. *See* Electric heating apparatus.
- Flavoring extract industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Flax and hemp, dressed, industry, establishments, wage-earners, and earnings, 649, 718, 726, 734.
- Flour and grist mill industry, power used, 620-623; products, value, 693; establishments, wage-earners, and earnings, 718, 726, 734, 778, 782.
- Fluxes, used as material, 13, 28, 43, 47, 72.
- Food preparations, industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Fore River Shipbuilding Co., steel battle ships built, 337.
- Forge pig iron, establishments, 33; produced, 33, 74.
- Forges and bloomeries, active and idle establishments, capital, 9, 70; wage-earners, 11; fuel, 12; materials used, 13; equipment and products, 14; discussion relating to, 70, 71.
- Forging, iron and steel industry, establishments, wage-earners, and earnings, 718, 726, 736.
- Forging machines, 227, 230.
- Foundry, pig iron, establishments, 32, 34, 74.
- Foundry and machine shop industry, agricultural implements manufactured, 138; establishments, wage-earners, and earnings, 651, 718, 726, 734, 754, 774-790.
- Foundry supplies industry, establishments, wage-earners, and earnings, 718, 726, 734.
- France, exports of agricultural implements to, 139.
- Frank, A., potassium chloride extraction, patents, 426.
- Frank and Caro, calcium cyanamid manufacture, 434, 448.
- Frasch, Herman and Hans, ammonia-soda process, 422.
- Freight, cost of, in specified industries, blast furnaces, 74; steel works and rolling mills, 80; copper smelting and refining, 112; lead smelting and refining, 120, 121; zinc smelting, 126; agricultural implements, 148; musical instruments, 252, 256, 261, 266; carriages and wagons, 312, 318, 324; steam and street railroad car, 371, 374, 378, 382, 389; chemicals and allied products, 400, 507-512; coke, 528; petroleum refining, 575; shipbuilding, 352.
- Fritzsche, P., patent for ether production, 484.
- Fruit cars, steam railroad, built, 366.
- Fuel, used in specified industries, iron and steel, 12, 540; blast furnaces, 29, 35, 38, 39, 41-45, 74; steel works and rolling mills, 52, 80, 540; tin and terne plate, 89, 91, 95, 97; copper smelting and refining, 112; lead smelting and refining, 121; zinc smelting, 126; agricultural implements, 142, 148; electrical machinery, apparatus, and supplies, 218; musical instruments, 252, 256, 258, 260, 266; automobiles, 282; bicycles and tricycles, 294; carriages and wagons, 304, 312, 318, 324; shipbuilding, 348, 352; steam and street railroad car industry, 371, 374, 378, 382, 390; chemicals and allied products, 400, 507-512; coke, 528; petroleum refining, 569, 575.
- Fuller, Myron L., on source of carbon dioxide, 481.
- Fulton, John, beehive ovens designed by, 533; quoted on the structure of coke, 539.
- Fur goods industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Furnaces. *See* Anthracite furnaces, Blast furnaces, Electric furnaces, and Open-hearth steel.
- Furnishing goods, men's, industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Furniture cars, steam railroad, built, 366.
- Furniture industry, establishments, wage-earners, and earnings, 651, 718, 726, 734, 756, 776, 790.
- Furniture vans and wagons, 312, 318, 324.
- Fusel oil, refined, 482; used as material, 484.
- Fuses, electric, 212, 213.
- Fuses and lightning arresters, statistics, 211-213; produced, 212.
- Fustic, used as material, 451; imports, 457.
- Fustic extract, used as material, 451.
- Galenite, formula, 407; value as a sulphuric acid mineral, 408.
- Galvanizing industry, establishments, wage-earners, and earnings, 649, 718, 726, 734.
- Gambier or terra japonica, imports consumed, 457.
- Garbage wagons and carts, 312, 318, 324.
- Gardening implements, 144, 150.
- Gary, Ind., steel works, motors in use, 169, 170.
- Gas, illuminating, produced, 479.
- Gas, illuminating and heating, industry, establishments, wage-earners, and earnings, 649, 718, 726, 734, 784. *See also* Natural gas.
- Gas, surplus in coke industry, 523.

- Gas and lamp fixture industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Gas Engine and Power Co., and Chas. L. Seabury Co., Consolidated, gunboats built, 337.
- Gas machines and meters industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Gases, compressed and liquefied, produced, 402, 479, 508; manufacture, 478, 482; establishments, wage-earners, and earnings, 479.
- Gasoline, uses, 580.
- Gayley dry-air blast, discussion of, 45.
- Gayley, James, application of dry-air blast to manufacture of iron, 480.
- Gears, used as material in carriage and wagon manufacture, 304, 310, 316, 322.
- Geber, on nitric acid production, first description in chemical history, 412; muriatic acid, 417; acetic acid, 418.
- General Chemical Co., contact process plant, 410.
- General chemicals, produced, 402; definition, 485; discussion, 485-489.
- Generators, double current, 167.
- Geographic divisions, industries shown by, iron and steel, 16, 20, 21; agricultural implements, 131, 132; carriages and wagons, 302, 303; shipbuilding, 337, 344, 346; steam and street railroad cars, 364, 367, 388; chemicals and allied products, 406, 418, 422, 439, 462, 469, 478, 479, 483, 487; power employed in manufactures, 625; earnings of wage-earners, 654, 656, 660, 663, 666, 667, 670, 672, 678, 679, 683, 684, 686-689, 691, 692, 694, 695, 697, 698, 700-705, 710-715, 742-773.
- Georgia Chemical Works, chamber process plant, 411.
- Germany, exports to, agricultural implements, 139; coal tar products, 432; bleaching powder products, 442, 443; coal tar industry in, 453.
- Gigs, 312, 318, 324.
- Glass cutting, staining, and ornamenting industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Glass industry, sodas used, 423, 424; potash or pearlash, 427; wage-earners and earnings, 651, 659-662, 718, 726, 734; by specified states, 758, 776, 778, 784, 786.
- Glauber's salt, produced, 486; imports, 489.
- Gloves and mittens, leather, industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Glucose industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Glue industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Glycerin, used as material, 400, 470, 487, 507, 509; produced, 402, 470, 486; imports, 488.
- Goethe, on saving volatilized matter, 534.
- Cold, product, copper and lead, smelting and refining industry, 102; copper, smelting and refining, 105, 107-110, 112, 113; lead, smelting and refining, 115, 117-122; establishments reporting gross and net values, 120; imports and exports, 122; used as material, in fine chemicals, 484.
- Gold and silver leaf and foil industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Gold and silver reducing and refining (not from ore) industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Gold salts, produced, 402, 482, 508.
- Goldschmidt, Hans, production of alumina, 447.
- Gondolas, steam railroad, built, 366.
- Government Printing Office, electric motors used, 170; direct current switchboard, 175; electric heating equipment, 211.
- Government shipyards. *See* Shipyards, Government.
- Governmental establishments. *See* Shipbuilding industry.
- Grain cradles, 136, 144, 150.
- Grain sowers, 136, 142, 148.
- Graphite, and graphite refining, industry, establishments, wage-earners, and earnings, 718, 726, 734. *See also* Electrochemicals.
- Graphophones. *See* Phonograph and graphophone industry.
- Graselli Chemical Co., chamber process plant, 411.
- Gray, Prof. Elisha, submarine telephone signalling system, 199.
- Grease, from petroleum, method of manufacture, 582.
- Grease and tallow industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Great Lakes district, shipbuilding in, 335, 338, 339.
- Great Northern Power Co., transformers built, 174; plant, 634.
- Greely, Gen. A. W., Chief Signal Officer, United States Army, 206.
- Greenville Fertilizer Co., chamber process plant, 411.
- Greisheim process, nitric acid condensation, 413.
- Griffith and Boyd, chamber process plant, 411.
- Grinding and polishing machines, produced, 227; by states, 229.
- Grindstone industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Ground and chipped wood, tanning materials, produced, 402, 458; dyestuffs, produced, 451, 511.
- Ground bark, leaves, roots, and wood, dyestuffs, consumed as material, 511.
- Grubbing machines, 144, 150.
- Guano, imports, 441.
- Guantanamo, Cuba, war cable laid, 206.
- Gums, used as material, 400, 463, 508, 510.
- Gums and dextrin, dyestuffs, produced, 451, 511.
- Gun cotton, or pyroxylin (explosive), produced, 402, 468; per cent of nitric and sulphuric acid in, 416.
- Gunpowder, produced, 402, 468, 470, 509; census classification, 471; imports and exports, 475.
- Gutta-percha, for submarine cables, 206.
- Guttman, on chamber process for sulphuric acid production, 409; nitric acid condenser, 413.
- Gypsum wall plaster industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Hacks, 312, 318, 324.
- Hairwork industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Hamilton Cataract Power and Light Co., plant, 634.
- Hammered scrap blooms and imported Swedish billets and bars, used as materials, 13, 52, 78.
- Hammers, steam, power, and drop, produced, 227, 230.
- Hammock industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Hand carts, agricultural, 137, 144, 150; business, 312, 318, 324.
- Hand knit goods industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Hand stamp industry, establishments, wage-earners, and earnings, 718, 726, 734.
- Hansoms, public, 312, 318, 324.
- Hard or antimonial lead production, 114, 115, 117, 119; establishments, 117; by states, 118; summary, 121.
- Hardware industry, establishments, wage-earners, and earnings, 718, 726, 736, 774.
- Hardware, saddlery, industry, establishments, wage-earners, and earnings, 718, 726, 736.
- Harkins, W. D., on industrial value of smelter smoke, 408.
- Harrison Bros. Co., contact process plant, 410.
- Harrowes, 135, 136, 144, 150.
- Hart's nitric acid condenser, construction, 413.
- Harvesters, headers, and binders, 135, 136, 144, 150.
- Harvesting implements, value, by states, 135; summaries, 136, 144, 150; establishments reporting, 137, 138.
- Hasenclever, —, on world's production of bleaching powder, 442.
- Hat and cap industry, straw and wool, establishments, wage-earners, and earnings, 718, 726, 736.
- Hat and cap materials industry, establishments, wage-earners, and earnings, 718, 726, 736.
- Hats, felt, straw, and wool industry, establishments, wage-earners, and earnings, 718, 726, 736, 774, 784.
- Hay and bale ties, 59.
- Hay carriers, 136, 137, 144, 150.
- Hay cutters, 137, 144, 150.
- Hayes, S. Dana, method of producing burning oils, 572.
- Hayforks, 135, 136, 144, 150.
- Hay loaders, 136, 137, 144, 150.
- Hay presses, 137, 144, 150.
- Hayracks, 137, 144, 150.
- Hayrakes, 136, 137, 144, 150.



- Hay stackers, 136, 137, 144, 150.  
 Hay tedders, 136, 137, 144, 150.  
 Hearses, 312, 318, 324.  
 Hemlock bark, imported, 460; used as material, 559.  
 Hemlock extract, produced, 458, 511; imported, 460.  
 Héroult electric furnace, description and product, 22, 23.  
 Hickory, use in automobile manufacture, 280.  
 High speed steel, invention, effect on metal-working machinery industry, 232.  
 High tension cables, development, 205.  
 Hildreth, Doctor —, filtration of petroleum for medicinal use, 577.  
 Hoes, 136, 137, 144, 150.  
 Holcomb Steel Co., installation of Héroult electric furnace, 22.  
 Holyoke, Mass., Water Power Co., switch-board equipment, 175.  
 Hones and whetstones industry, establishments, wage-earners, and earnings, 649, 718, 726, 736.  
 Hoops, bands, cotton ties, and skelp, iron and steel, produced, states reporting, 53-55.  
 Horizontal turbo-generators. *See* Turbo-generators.  
 Horse cars, 366.  
 Horse hayforks, 135-137.  
 Horse hayrakes, 135-137.  
 Horse nails. *See* Nails.  
 Horsepower, summary, 619; idle establishments reporting, 620; by industries, 622, 623; per wage-earner, 624; by geographic divisions, 625. *See also* Power.  
 Horsepowers, agricultural, 137, 144, 150.  
 Horseshoe industry, establishments, wage-earners, and earnings, 718, 726, 736.  
 Hose wagons, 312, 318, 324.  
 Hosiery and knit goods industry, power employed, 621-624; establishments, wage-earners, and earnings, 651, 718, 726, 736, 758, 774, 776, 780, 790.  
 Hotels, adoption of electric cooking apparatus by, 210.  
 House furnishing goods industry, establishments, wage-earners, and earnings, 718, 726.  
 Hydraulic energy, utilization and conversion, in transmission plants, 635.  
 Hydriodate, iodide, and iodate of potash, produced, 485.  
 Hydrogen, liquid and compressed, use of, 481, 482.  
 Hydrogen dioxide, bleaching material, produced, 441.  
 Hypochlorites, produced, 402, 441, 507.  
 Ibbotson, S. E., report on Kjellin furnace, 24.  
 Ice, manufactured, establishments, wage-earners, and earnings, 718, 726, 736.  
 Ice wagons, 312, 318, 324.  
 Illinois, rank in iron and steel industry, 6-8, 51, 54, 59, 62, 67, 68; agricultural implements, 133, 136; electrical machinery and appliances, 193, 207, 208, 214; musical instruments, 242, 243; steam and street railroad cars, 364.  
 Implements, cultivation. *See* Agricultural implements.  
 Imports, for consumption, in tin andterne plate industry, 92; musical instruments, attachments, and materials, 242; carriages and wagons, 307; chemicals and allied products, 407, 419, 425, 428, 430, 432, 434, 437, 441, 446, 450, 457, 460, 468, 475, 477, 478, 485, 488; coke, 525, 526; petroleum refining, 574.  
 Incandescent lamp signals, used in telephony, 194.  
 Incandescent lamps, statistics of production, 161, 183-190.  
 Independent telephone system, service, 192, 193.  
 Indiana, rank in production of bars and rods, 54; agricultural implements, 136; electrical machinery and appliances, 177, 193, 214; steam railroad cars, 364.  
 Indianapolis, Ind., statistics of automobile manufacture, 274.  
 Indigo, used as material, 451, 511; imports, 457.  
 Induction motors. *See* Motors, electric.  
 Industries, analysis of earnings in selected, 648-812.  
 Ingots, blooms, billets, etc., iron or steel, establishments, 14, 61, 69, 71, 77-79; used as material, 13, 52, 78, 89, 95; produced, 52, 53, 56, 61, 63, 64, 66, 67, 69, 71, 80.  
 Ingots, wire, bars, etc., copper, establishments and production, 105, 107-110, 113.  
 Ink, printing and writing, industry, establishments, wage-earners, and earnings, 718, 726, 736.  
 Instruments, professional and scientific, industry, establishments, wage-earners, and earnings, 718, 726, 736.  
 Insulated metal, use in interior electric conduits, 207; wires and cables, produced, 159, 161, 204-206.  
 Insulating, materials, 217.  
 Interborough Railway System, New York, push-button control system used, 175.  
 Interborough Rapid Transit plant, New York, turbo-generators used, 165.  
 Interborough Subway System, New York, motive power equipment, 171.  
 Interchangeable tools, 235, 236.  
 International Acheson Graphite Co., 445.  
 International Electrical Congress, section devoted to electro-therapeutics, 216.  
 Inter-pole motors, 170.  
 Interurban railway systems, equipment and operation, 171-173.  
 Iodides, produced, 482.  
 Iodine, imports, 485.  
 Iodoform, imports, 485.  
 Iron and steel industry, discussion, 3-71; establishments included, 3; comparative summaries, 4-6; product by states, 7; establishments, 8, 14, 15, by states, 9, 10; wage-earners, by branches, 11; fuel consumed, 12; materials used, 13; production, discussion, 13-14; by geographic divisions, 15-22; in New England and Middle states, 21, 22; electrothermic metallurgy, 22-24; power used, 620-624; establishments, wage-earners, and earnings, 718-720, 726-728, 736.  
 Iron liquor dyestuffs, produced, 451, 511.  
 Iron ore, electric smelting of, 23, 450; used as material, 13, 28, 43, 47, 52, 71, 72, 80, 89, 95.  
 Iron oxides, and other earth colors, produced, 402, 461, 466, 508, 510; used as material, 463.  
 Iron sulphate, imported, 488.  
 Ivory and bone work industry, establishments, wage-earners, and earnings, 720, 728, 736.  
 Ivory and keys, piano, 250; organ, 251.  
 Ivoryton, Conn., rank in manufacture piano materials, 250, 251.  
 Jackson Fertilizer Co., chamber process plant, 411.  
 Japan lacquers, and liquid dryers, 402.  
 Japanning industry, establishments, wage-earners, and earnings, 720, 728, 736.  
 Jarecki Chemical Co., chamber process plant, 411.  
 Jewelry and instrument case industry, establishments, wage-earners, and earnings, 718, 728, 736.  
 Jewelry industry, establishments, wage-earners, and earnings, 720, 728, 736, 780, 788.  
 Juniata Hydro-Electric Co., plant, 634.  
 Jute and jute goods industry, establishments, wage-earners, and earnings, 720, 728, 736.  
 Kainit, used as material, 400, 440, 509.  
 Kalamazoo, Mich., statistics of automobile manufacture, 274.  
 Kalsomine. *See* Paints and varnishes.  
 Kaolin and ground earth industry, establishments, wage-earners, and earnings, 720, 728, 736.  
 Keller furnace, description, 22, 23.  
 Kentucky, rank in value of iron and steel products, 7, 8; production of ferrosilicon, 34.  
 Kerosene, 572.  
 Kieserite, kyanite, or cyanite and kainite, imported for consumption, 441.  
 Kjellin furnace, production, 22, 24; description, 23, 24.  
 Knab-Carvés by-product oven, 534.  
 Kneitsch process, sulphuric acid extraction, 409.  
 Köschst process, sulphuric acid extraction, 409.  
 Krupp Works, electric induction furnace used, 24.  
 Labels and tags industry, establishments, wage-earners, and earnings, 720, 728, 736.  
 Labrador, exports to, 139.  
 Lacquer. *See* Paints and varnishes.  
 Ladd, Story B., section on iron and steel industry, 3-71; tin andterne plate, 87-96; copper, lead, and zinc, smelting and refining, 101-125.

- Lake and river traffic, importance to shipbuilding industry, 337, 338.
- Lake Shore Electric System, power equipment, 171.
- Lamp and other blacks, pigments, produced, 402, 508.
- Lamp signal annunciators, electric, construction and advantages, 207, 208.
- Lampblack, produced, 461; process of obtaining, 465.
- Lamps and reflectors industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Lamps, decorative and miniature, X-ray bulbs, vacuum tubes, etc., produced, 183; discussion, 187-190. *See also* Arc lamps, Incandescent lamps, and Mercury vapor lamps.
- Landaus, 312, 318, 324.
- Lapidary work industry, establishments, wage-earners, and earnings, 649, 720, 728, 736.
- Lard, refined, industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Lasts industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Lathes, metal working, produced, 227; improvement, 232, 233.
- Laughing gas, produced, 479.
- Lawn mowers, 137, 144, 150.
- Lazaretto Guano Co., chamber process plant, 411.
- Lead, bar, pipe, and sheet, industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Lead, smelting and refining, statistics, 101, 102, 113-122; establishments, wage-earners, and earnings, 113-116, 119, 121, 122; products, 113-122; used as material, 400, 507.
- Lead oxides, produced, 402; used as material, 403, 463, 508; process of obtaining, 465.
- Leather, used as material, in carriage and wagon industry, 304; tanned, curried, and finished, industry, establishments, wage-earners, and earnings, 651, 720, 728, 736; by states, territories, and geographic divisions, 760; by specified states, 774, 780, 784, 788, 790.
- Leather goods industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Leather substitutes, produced, 475.
- Le Blanc process of soda production, 420-422.
- Leominster, Mass., rank in manufacture of piano materials, 250.
- Lewis, George T., process of manufacturing sublimed white lead, 464.
- Lighting carbons, 179.
- Lighting plants, census, 158.
- Lightning arresters, produced, types and construction, 212, 213.
- Ligroin, uses of, 580.
- Lime, used as material, 400, 440, 442, 445, 480, 487, 507, 510, 512; produced, 479; chloride imported, 433.
- Lime industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Lime spreaders, 136, 142, 148.
- Limestone, used as material, 400, 440, 480, 507-509.
- Lindenberg, Richard, steel plant, 23.
- Linen goods industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Linseed oil, used as material, 400, 463, 508, 510.
- Liquid dryers, japans, and lacquers, produced, 461, 508, 510.
- Liquid fillers, produced, 461, 508, 510.
- Liquors industry, distilled, establishments, wage-earners, and earnings, 720, 728, 736; by specified states, 778; malt, by specified states, 776, 782, 786, 790; vinous, rank of Pacific division in production, 705; by specified states, 774.
- Listers, 136, 142, 148.
- Litharge, 444, 465.
- Lithographing and engraving industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Locomotives, electric, description of, in use on specified railroads, 171, 172; steam, built, by states, 362, 374, 378, 382; establishments, wage-earners, and earnings, 720, 728, 736.
- Logwood, used as material, 451, 511; imports, 457; treatment, by compressed carbon dioxide, 481.
- Logwood extract, used as material, 451; products, 511.
- Logwood extracts, imports, 457.
- Looking-glass and picture frames industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Louisiana Purchase Exposition, exhibit of process of liquefying hydrogen, 481.
- Low-phosphorus pig iron, establishments reporting, and quantity produced, by states, 32, 74.
- Lullius, Raymond, production of nitric acid, 412.
- Lumber, used as material in carriage and wagon industry, 304; shipbuilding, 348, 350-353.
- Lumber and planing mills, manufacturing agricultural implements, number and value, 138; establishments, wage-earners, and earnings, 651, 720, 728, 736; by states, territories, and geographic divisions, 762; by states, 774, 776, 778, 782, 786, 788, 790.
- Lumber and timber products industry, power employed, 620-624; average size of steam engine employed, 628; establishments, wage-earners, and earnings, 651, 720, 728, 736; rank of Pacific division in production, 705; earnings by states, territories, and geographic divisions, 762; by specified states, 774-790.
- Lunge, George, on galenite, 408; processes of sulphuric acid extraction, 409; uses of sulphuric acid, 411.
- Mabery, on sulphur waste, 408; petroleum, 576.
- McAdam, W. A., aluminum casting, patent for, 447.
- Machinery. *See* Electrical machinery and Metal working machinery.
- McKenna, Charles F., report on transportation of explosives, 473-475.
- Madder, imported for consumption, 457.
- Madison River Power Co., electrical transmission plant, 634.
- Magnesia, calcined, produced, 479.
- Magnesia sulphate. *See* Epsom salts.
- Magnesite, used as material, 480, 487.
- Magnetite arc lamp. *See* Arc lamps.
- Magneto ignition, 215, 216; substations, 197.
- Mail and mail carriers' wagons and carts, 312, 318, 324.
- Mail cars, built, 366.
- Maine, rank in shipbuilding industry, 341; water power used, 629.
- Malt liquors industry. *See* Liquors industry.
- Manganese dioxide, used as material, 442.
- Manhattan Railway system, push-button control installed, 175.
- Mannheim process, sulphuric acid extraction, 409, 410.
- Mantels, slate, marble, and marbleized, industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Manure spreaders, 136, 142, 148.
- Marble and stone work industry, establishments, wage-earners, and earnings, 720, 728, 736, 780.
- Marcasite, formula, 407.
- Marconi, autocoherer invented by, 203.
- Mare Island navy yard, steel training bark built, 337.
- Marine railways. *See* Railways, marine.
- Markers and furrowers, 136, 144, 150.
- Martin, Thomas Commerford, section on Electrical machinery, apparatus, and supplies, 157; power employed, 619.
- Maryland, rank in iron and steel industry, 7, 8, 54.
- Massachusetts, rank in specified industries, iron and steel, 7, 8; electrical machinery, 193, 206-208, 210, 214; metal working machinery, 227, 345; musical instruments, 242, 243; marine railways, 345; bleaching material, 442; power employed, 626, 629; boots and shoes, 655; cotton goods, 657; tobacco, cigars, and cigarettes, 666; women wage-earners, 680.
- Masts and spars, 348, 350-353.
- Match industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Materials used, cost, in specified industries, iron and steel, 4-6, 16, 18, 19; blast furnaces, 25, 27, 28, 41-43, 46, 47, 71, 72, 74; steel works and rolling mills, 49, 50, 52, 78-80, 52; forges and bloomeries, 70, 71; tin andterne plate, 87, 89-91, 94, 95, 97; copper, lead and zinc, smelting and refining, 101, 103, 105-108, 110-116, 119-124, 126; agricultural implements, 129, 131, 132, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 273, 275, 282; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-303, 304, 307, 310, 316, 322; shipbuilding, 331-335,

- 348, 350, 352; steam and street railroad car, 357, 358, 364, 365, 367, 368-371, 374, 378, 382, 386, 388-390; chemicals and allied products, 398, 399, 400; acids, 404, 417, 504, 511; sodas, 421; alums, 428; coal tar products, 430; cyanides, 432; wood distillation, 435, 505, 512; fertilizers, 438, 440, 496, 509; bleaching materials, 441, 442; electrochemicals, 444, 445; dyestuffs, 450, 451, 502, 511; tanning materials, 458, 459; paints and varnishes, 461, 463, 494, 500, 508, 510; explosives, 468, 470, 498, 509; plastics, 475, 476; essential oils, 477, 478, 506, 512; gases, compressed and liquefied, 479, 480; chemicals, 482, 484, 486, 490, 507; bone, ivory, and lamp black, 507; coke, 515, 528; petroleum refining, 567, 569, 575.
- Mathiesson Alkali Co., ammonia-soda process, 422.
- Mathot, R. E., use of gas engines in metallurgical works, 637, 638.
- Mats and matting industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Matte. *See* Copper, smelting and refining.
- Matthews, on sulphur dyes, 455, 456.
- Mattress and spring bed industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Mauve dyestuff, discovery of, 452.
- Men. *See* Wage-earners and wages.
- Men's clothing industry. *See* Clothing, men's.
- Mercury bulb or vacuum tube, utilization of, 188, 189.
- Mercury vapor lamps, development and improvement, 187, 188.
- Meriden, Conn., rank in musical instrument industry, 248.
- Meridian Fertilizer Co., chamber process plant, 411.
- Merriam, Robert H., section on Bicycles and Tricycles, 289-297.
- Merrimac Chemical Co., chamber process plant, 411.
- Metal working machinery products, 225, 227; discussion, 225-236; exports and imports, 226; development, 231-236.
- Metallic filaments, for incandescent lamps, 185-187.
- Metallic sodium, used as material, 442.
- Meters, prepayment. *See* Electric meters.
- Mexican Government, use of rubber submarine cable, 206.
- Mexican Light and Power Co., plant, 634.
- Mexico, ores, imported from, 122; automobile exports to, 276.
- Meyer's tangent system, sulphuric acid extraction, 409.
- Michigan, rank in iron and steel industry, 7, 8; electric appliances, 193, 207, 210.
- Michigan Alkali Co., ammonia-soda process, 422.
- Middle states, iron and steel industry, 21, 22.
- Milk, sugar of, imported, 488.
- Mill cinder, scrap, etc., used as material, 13, 28, 43, 47, 72.
- Miller, Fred J., section on Metal Working Machinery, 225-236.
- Millinery and lace goods industry, establishments, wage-earners, and earnings, 720, 728, 736, 786.
- Milling machines. *See* Metal working machinery.
- Mineral and soda water industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Minor, John C., on carbon dioxide, 480, 481.
- Mirror industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Missouri, rank in production of lead, 114, 116, 118.
- Missouri River Power Co., electrical transmission plant, 634.
- Mixer, or receiver, use, 35.
- Model and pattern industry, other than paper, establishments, wage-earners, and earnings, 720, 728, 736.
- Monazite, used as material, 484.
- Monument and tombstone industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Moore system, vacuum vapor lamps, 188.
- Moran Bros., battleship built by, 337.
- Mordants. *See* Dyestuffs.
- Morphia, imports, 485.
- Motor, gasoline, use of, 278, 279.
- Motor boat building, growth of industry, 340.
- Motor car, in New York Central suburban traffic, 173.
- Motor cycle, history, 291, 292.
- Motor generators, dynamotors, and boosters, 163-173.
- Motor rheostats apparatus, 209, 210.
- Motors, electric, classification, production, and use, 157-173, 279, 619, 620, 628, 633, 634; compound, 169; steam, 277, 278; petrol, 278, 279; water, 649, 620, 631.
- Mountain wagons, 312, 318, 324.
- Mowers, 135, 136, 139, 144, 150.
- Mucilage and paste industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Muck, or scrap bar, used as material, 13, 51-53, 55, 78.
- Mundy, Arthur, telephonic submarine signalling, 199.
- Munroe, Prof. Charles E., section on Chemicals and allied products, 397-512; report on transportation of explosives, 473-475; section on Coke, 515-541; Petroleum, 567-583.
- Muriatic acid, production and use, 417, 418, 484, 487.
- Musical instruments, attachments, and materials, section on, by William F. Wooster, 239-266; establishments, wage-earners, and earnings, 239-241, 252, 256-260, 720, 728, 736, 776, 786; products, 239-241, 243, 245, 247, 248, 250, 254, 257, 259, 262; exports and imports, 242.
- Nail and tack plate, produced, 53, 55.
- Nails, statistics of establishments, wage-earners, and earnings, production, kinds, and states reporting, 57-59, 718, 726, 736.
- Naphtha and gasoline, produced, 570, 573, 575; kinds and uses, 580.
- National Electric Light Association, report on electric heating, 210.
- National Electrolytic Co., 445.
- Natural gas, used as fuel, iron and steel industry, 12; steel works and rolling mills, 52, 80; blast furnaces, 74; tin andterne plate, 89, 91, 95.
- Natural oils. *See* Oils, essential.
- Naval stations, dry docks at, 345.
- Navy yards, Government, shipbuilding operations, 335.
- Needles, pins, and hooks and eyes industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Nernst lamps, description and advantages, 189, 190; for street lighting, 190.
- Net and seine industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Nevada Mining and Milling Co., power, 631.
- New England division, discussion relative to industries, wage-earners and earnings, 680-683. *See also* Geographic divisions.
- New England states, iron and steel industry, 21.
- Newfoundland, exports to, 139, 276; pyrites imported from, 407.
- New Hampshire, women wage-earners, 680.
- New Jersey, rank in production of iron and steel, 6, 7, 8; crucible steel, 69; incandescent lamps, 159; insulated wires and cables, 204; electric conduits, 206; electric measuring instruments, 214; marine railways, number and capacity, 345; bleaching materials, 442; tanning materials, 458.
- New Jersey Zinc Co., contact process plant, 410.
- New Mexico, women wage-earners, 680.
- Newport News Shipbuilding Co., battle ships built, 337.
- New York, rank in specified industries, iron and steel, 6, 8, 51, 54, 56, 68, 69; agricultural implements, 133; telephone manufacture, 193; insulated wire and cable industry, 204; electric conduits, 206; electric annunciators, 207; electric clocks, 208; electric heating, cooking, and welding appliances, 210; musical instruments, 242, 243; marine railways, number and capacity, 345; bleaching materials, 442; electrochemicals, 444; horsepower, 626; waterpower, 629.
- New York, New Haven and Hartford Railroad, single phase motor equipment, 171, 172.
- New York, N. Y., rank in production of piano and organ materials, 250, 251; automobile manufacture, 274.
- New York Central and Hudson River Railroad, electric storage battery equipment, 172, 173; copper wire and cable, length and weight of, used in transmission circuits, 204.
- Niagara Falls, N. Y., rank in electrochemical industry, 445.
- Niagara Falls Hydraulic Power and Manufacturing Co., 445.

- Niagara Falls Power Co., development of power and description of apparatus, 164, 445.
- Niagara, Lockport and Ontario Co., electrical transmission plant, 634.
- Niagara Research Laboratory, 445.
- Niter, for dynamites, 472.
- Niter cake, composition and uses, 415; produced, 486, 511; imports, 489.
- Nitrate of ammonia, used as material, 403, 470, 509.
- Nitrate of potash. *See* Potash, nitrate.
- Nitrate of soda, used as material, 400, 404, 406, 440, 487, 488, 509, 511.
- Nitric acid, used as material, 400, 403, 412-415, 476, 484, 487, 507-509; produced, 401, 404, 412-415, 511; establishments, by states, 412; results obtained with Valentiner vacuum apparatus, 414.
- Nitrogen, in slaughterhouse fertilizers, 440, 441.
- Nitroglycerin, produced, 402, 468, 471; used as material, 403, 509; percentage of nitric and sulphuric acid in, 416; artificial refrigeration, 471, 472.
- Noble Electric Steel Co., reduction works, 23.
- Nonargentiferous ores, produced, 115, 117, 119; establishments, 117; by states, 118; gross and net values, 120; summary, 121.
- Noosack Falls Power Co., plant, 634.
- Northern Aluminum Co., plant, 446.
- Northern California Power Co., plant, 634.
- Northern Ohio Traction and Light Co., storage battery equipment, 177.
- Northern South Atlantic division, discussion relative to industries, wage-earners, and earnings, 685-688. *See also* Geographic divisions.
- Norton Emery Wheel Co., alundum manufacture, 445, 447.
- Nottoden, Norway, electric furnaces for nitric acid distillation, 414.
- Nux vomica, imports, 485.
- Oak and chestnut extracts, produced, 458, 511.
- Oakum and pitch, used as material in shipbuilding, 348, 350-353.
- Oakum industry, establishments, wage-earners, and earnings, 649, 720, 728, 736.
- Oceania, exports to, automobiles and automobile parts, 276; carriages and wagons, 307; steam and street railroad products, 367.
- Ohio, rank in, value of iron and steel products, 6, 7; production of iron for steel making, 34, 35; steel works and rolling mills products, 51, 54-56; use of natural gas as fuel, 52; total steel production, 62; open-hearth steel, 67, 68; steel castings, 68; agricultural implements, 133; metal working machinery, 225-228, 230; steam and street railroad cars, etc., 364; horsepower employed, 626; storage batteries installed by interurban railway systems, 177; telephonic manufacturing industry, 193.
- Ohio Farmers Fertilizer Co., chamber process plant, 411.
- Oil, used as fuel in specified industries, iron and steel, 12, 52, 80; tin and terne plate dipping and black plate combined, 89; tin and terne dipping, 91; black plate, 95; used as material, tin and terne plate, 97; compressed and liquefied gases, 480.
- Oil, cottonseed and cake, industry, establishments, wage-earners, and earnings, 649, 690, 720, 728, 736; by specified states, 774, 776, 778, 788.
- Oil, essential, linseed, etc., statistics of production, establishments, wage-earners, and earnings, 402, 477, 512, 720, 728, 736.
- Oil cake, uses, 448.
- Oilcloth and linoleum industries, establishments, wage-earners, and earnings, 720, 728, 736.
- Oil of aniline, imports, 457.
- Oils, used as material in dyestuffs industry, 451; paint, 476, 508; volatile, or essential, and distilled, imports and exports, 478; varnish, 510; petroleum, produced, 570, 575; exports, 573; classifications, 580-582; methods of transportation, 582, 583; burning, definition of term, 572; mineral, imports, 574.
- Olds, R. E., experiments with steam motors, 277, 278.
- Oleomargarine industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Oleum, produced, 405, 511.
- Oller, George E., section on Automobiles, 269-280.
- Omnibuses, 312, 318, 324.
- Ontario Power Co., plant, 631, 634.
- Open-hearth steel, furnaces and establishments, 14, 15, 61, 66; products, 53, 66; by states, 67; number and capacity of furnaces, 68, 69; summary, 80-83.
- Optical goods industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Orchil, imported, 457.
- Ordnance, produced, 60.
- Ordnance and ordnance stores industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Ore wagons, 312, 318, 324.
- Ores, used as material, lead smelting industry, 115, 116, 119, 121; imported, 122; zinc smelting, 123, 124, 126. *See also* Iron ore.
- Ores, chrome and iron, used in manufacture electro-chemicals, 445.
- Ores and concentrates, used as material, in copper smelting and refining industry, 105-108, 110, 112.
- Organ materials and parts, 250, 251; summary, 258, 259.
- Organs, summaries, 240, 256, 257; produced, 240, 245, 247; reed, 245, 246; pipe, 246, 247; street and self-playing, 248, 249.
- Osius, chemical properties, advantages, 186.
- Otto, Dr. N. A., use of four-cycle engine, 278.
- Otto cycle, used for automobiles, 278.
- Otto-Hoffman, by-product oven. *See* Ovens.
- Ovens, coke, number and value, 516; by-product, description and methods of operating, 521, 534-539; active establishments, 521, 522; idle, 522; Belgian, 533; beehive, 534; Knab-Carvés, 534; Weeks, 534; Coppée, 534, 537; Otto-Hoffman, 534, 537, 538; Semet-Solvay, 536, 537; United-Otto, 538; Rothberg, 538, 539.
- Oxalic acid, imported, 419.
- Oxide of zinc, produced, 461, 463; method of production, 465.
- Oxides of lead, produced, 461, 508, 510.
- Oxone, production and uses, 443.
- Oxygen, produced, 479.
- Pacific coast district, shipbuilding, 338, 339.
- Pacific division, discussion relative to industries, wage-earners, and earnings, 705-707. *See also* Geographic divisions.
- Paints and varnishes, establishments, wage-earners, and earnings, 398, 399, 460-463, 492, 494, 720, 728, 736; produced, 398, 399, 402, 461, 508-510; used as material, 304, 310, 316, 322, 508-510. *See also* Varnishes.
- Palm oil, used as material, 89, 91, 97.
- Palmetto, extract and root, 511.
- Panhard and Levassor, motor car constructed, 277.
- Paper, use in cable insulation, 205.
- Paper and wood pulp industry, power, 620, 624, 628; establishments, wage-earners, and earnings, 651, 720, 728, 738, 764, 780, 782, 786, 790.
- Paper goods industry, not elsewhere specified, establishments, wage-earners, and earnings, 720, 728, 738.
- Paper pattern industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Paraffin, oil and wax, 570-583.
- Park wagons, 312, 318, 324.
- Parsons, steam turbine invented, 628.
- Paste and putty fillers, produced, 508-510. *See also* Paints and varnishes.
- Patent medicines and compounds industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Patterson, G. W., on rebuilding mixed acids, 416.
- Paving material industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Pea hullers, 137, 144, 150.
- Peabody, George, first incandescent light fixture made for, 191.
- Peanut industry, establishments, wage-earners, and earnings, 649, 720, 728, 738.
- Pearce, William, first incandescent light fixture made by, 191.
- Pencils, lead, industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Penniman, Russell S., protected ammonium nitrate invented by, 473.
- Pennington, E. J., motor cycle experiments, 292.
- Pennock, on sulphuric acid waste, 408.
- Pennsylvania, rank in iron and steel products, 30, 34-36, 50, 52, 54-56, 59, 60, 62, 66-69; black plates, 96; electrical machinery, 206, 207, 214; metal working machinery, 230; steam and street railroad car industry, 364; coke industry, 520; petroleum refining industry, 568; power used, 626, 636.

- Pennsylvania Railroad terminal, New York city, Nernst lamp used, 190.
- Pennsylvania Salt Co., soda production, 422.
- Pens, fountain and stylographic, industry, establishments, wage-earners, and earnings, 720, 728, 738; gold, establishments, wage-earners, and earnings, 649, 720, 728, 738.
- Pentane, 580.
- Peppermint oil, produced, 477, 512. *See also* Oils, essential.
- Pepsin, 482.
- Perkin, William Henry, discovery of mauve, 452.
- Perfumery and cosmetic industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Peroxides, produced, 443.
- Petrolatum, produced, 581.
- Petroleum refining industry, establishments, wage-earners, and earnings, 567, 568, 574, 720, 728, 738, 784; products, 567, 570, 571-575; history, 576-583; patents, 587-615.
- Peyton Chemical Co., contact process plant, 410.
- Phaetons, 272, 273, 312, 314, 318, 320, 324.
- Philippine Islands, submarine cable system created by Signal Corps in, 206.
- Phoenix mills, compound motors installed, 169.
- Phonograph and graphophone industry, products, 264, 266; establishments, wage-earners, and earnings, 264, 720, 728, 738.
- Phosphate, imported, 441.
- Phosphate of soda, produced, 486, 508.
- Phosphate rock, 400, 440, 445, 487, 507.
- Phosphoric acid, used in manufacturing bleaching materials, 442.
- Phosphorus, manufacture, 450; imported, 485.
- Photographic apparatus and materials industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Photolithographing and photoengraving industry, establishments, wage-earners, and earnings, 649, 720, 728, 738.
- Piano d'Orta, Italy, production of lime nitrogen, 434.
- Piano materials and parts, 250, 251; detailed summary, 258, 259.
- Pianos, summaries, 242, 243; produced, 243; classes discussed, 243, 244; number and value, 243, 252-255.
- Pickles, preserves, and sauces, industry, establishments, wage-earners, and earnings, 649, 720, 728, 738.
- Pig lead, 89, 91, 97, 463, 487, 508.
- Pig iron, used as material, 13, 35, 51, 52, 71, 74, 78, 89, 95, 348, 350-353; establishments, wage-earners, and earnings, 25, 26, 28, 30, 32, 35, 36, 41-47, 72-76; production, 25-48, 74; exported, 40; chill cast, 74.
- Pigments, produced, 402, 466, 508, 510.
- Pig tin used as material, 89, 91, 97.
- Pikes Peak Hydro-Electric Co., machinery used, 631.
- Pintsch gas, 481.
- Pipe, iron and steel, industry, establishments, wage-earners, and earnings, 720, 728, 736.
- Pipe and reed organs. *See* Organs.
- Pipe, or tubes, clinched, brazed, and wrought, 60.
- Pipes, tobacco, industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Pitch, method of obtaining, 582. *See also* Petroleum.
- Pittsburg, Pa., first blast furnace gas engine installed, 637.
- Pittsburg Electric Works, compound motor installed, 169.
- Pittsburg Reduction Co., bauxite mines, plant, 445, 446.
- Planers, 227, 228.
- Planters, bean, corn, cotton, and potato, 135, 136, 142, 148.
- Plastics, produced, 402, 475, 507; exports and imports, 477.
- Plate towers, for acid condensation, 413, 418.
- Plated ware industry, establishments, wage-earners, and earnings, 720, 728, 738, 774.
- Plates, beams, etc., used as material, 348, 350-353.
- Platinum, used as material, 484.
- Platinum salts, produced, 402, 482, 508.
- Plows, 135, 136, 139, 144, 150.
- Plumbago. *See* Electro-chemicals and Graphite.
- Plumbers' supplies industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Pocketbook industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Police, fire, district, and miscellaneous telegraph apparatus, 200, 204.
- Police patrol wagons, 312, 318, 324.
- Poplar, use in automobile manufacture, 280.
- Porcelain electrical supplies, 157, 158.
- Portable tools, development and uses, 233.
- Portland, Oreg., magnetite arc lamps installed, 182, 183.
- Portugal, pyrites from, 407.
- Potash nitrate, used as material, 400, 440, 470, 507, 509; imported, 488.
- Potashes, discussion of production and methods of manufacture, 425-428; imports, 428, 434, 488; used as materials, 400, 442, 507.
- Potassium, produced, 401, 426, 433, 434, 507; used as material, 445.
- Potassium chloride, extraction, patents granted A. Frank, 426.
- Potato coverers, diggers, hillers, and hooks, 136, 144, 150.
- Pottery, terra cotta, and fire clay industry, products, 157; establishments, wage-earners, and earnings, 651, 720, 728, 738, 764, 784-788.
- Poultry netting, 59.
- Power employed in specified industries, iron and steel, 76, 80, 82; tin and terne plate, 97; copper, smelting and refining, 103, 113; lead, smelting and refining, 113, 122; zinc smelting, 122, 126; agricultural implements, 139, 146, 152; electrical machinery, apparatus, and supplies, 161, 166, 167, 173, 220; musical instruments, 254, 257, 259, 262, 266; automobiles, 273, 274, 284; bicycles and tricycles, 296; carriages and wagons, 314, 320, 326; shipbuilding, 347, 348, 352; steam and street railroad cars, 372, 376, 380, 384, 392; chemicals and allied products, 492, 494, 496, 499, 500, 502, 504, 505, 506; coke, 530; petroleum refining, 575; in manufactures, 619-625, 627, 630, 632, 634, 636, 638.
- Pratt, Joseph Hyde, on production of sublimed and zinc lead, 464.
- Presses, 570, 575.
- Printing and publishing industry, book and job, wage-earners, and earnings, 651, 720, 728, 738, 766, 774, 776, 780, 782, 786; music, establishments, wage-earners, and earnings, 720, 728, 738; newspapers and periodicals, 651, 720, 728, 738, 768, 774-780, 786, 788.
- Printing materials industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Printing telegraph systems. *See* Telegraph systems.
- Prison vans, 312, 318, 324.
- Products, value of, in specified industries, iron and steel, 4-6, 16, 18, 19; blast furnaces, 25, 27, 29, 41, 42, 44, 46, 48, 74; steel works and rolling mills, 49-50, 52-53, 80; forges and bloomeries, 70, 71; tin and terne plate, 87, 90-92, 94, 95, 97; copper, lead, and zinc, smelting and refining, 101, 103, 105, 107, 110-117, 119-126; agricultural implements, 129, 131, 132, 135, 138, 142, 148; electrical machinery, 158, 159, 161, 166, 167, 173, 174, 176, 179, 180, 183, 190, 192, 200, 204, 207, 208, 210, 212, 215, 217, 218; metal working machinery, 225, 227; musical instruments, 239-241, 254, 257, 259, 262, 264, 266; automobiles, 269, 270, 272, 273, 275, 282, 284; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-305, 307, 312, 318, 324; shipbuilding, 331-335, 348, 350, 352; steam and street railroad cars, 357, 358, 362-365, 367-371, 374, 378, 382, 386, 388-390; chemicals and allied products, 398, 399, 401, 402; acids, 404, 412, 415, 417-419, 504, 511; sodas, 421, 422; potashes, 426; alums, 428, 429; coal tar products, 430, 431; cyanides, 432, 433; wood distillation, 435, 436, 505, 512; fertilizers, 438, 439, 496, 509; bleaching materials, 441, 442; chemicals produced by electricity, 444, 445; dyestuffs and extracts, 450, 451, 502, 511; tanning materials, 458, 459; paints and varnishes, 461, 463, 494, 500, 508, 510; explosives, 468, 470, 499, 509; plastics, 475, 476; essential oils, 477, 478, 506, 512; gases, compressed and liquefied, 479, 480; fine chemicals, 482, 484; general chemicals, 486, 487; chemicals, 480, 507; bone, ivory, and lampblack, 507; coke, 515, 528, 530; petroleum refining, 567, 570, 575.
- Projectors. *See* Searchlights and projectors.
- Proprietors and firm members, of establishments engaged in specified industries, iron and steel, 72, 76; tin and terne plate,



- 96; copper, lead, and zinc, smelting and refining, 112, 121, 125; agricultural implements, 142, 148; electrical machinery, 218; musical instruments, 252, 256, 258, 260, 266; automobiles, 282; bicycles and tricycles, 294; carriages and wagons, 310, 316, 322; shipbuilding, 348, 350, 352; steam and street railroad cars, 371, 389; chemicals and allied products, 490, 492, 494, 500, 502, 504-507; coke, 528; petroleum refining, 574.
- Puget Sound Power Co., plant 634.
- Pulp goods industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Pumps, 137, 144, 150.
- Pupin, Dr. M. I., locating induction coils, 205.
- Push-button control system, for switchboards, 175.
- Putty, produced, 461, 467.
- Pyrite cinder, produced, 407, 511.
- Pyrites, statistics, 404-409; formula, 407; produced and imported, 407; used as material, 400, 404, 406, 407, 409, 440, 507, 509, 575.
- Pyrocellulose, composition, 416.
- Pyroligneous acid, produced, 436; imported, 437.
- Pyroxylin, for smokeless powder, 403, 416, 510; plastics, 416, 475, 507; varnish, 402, 461, 508, 510.
- Pyrrhotite, formula, 407; development, 408.
- Quincy process, for purification of service waters, 488.
- Quinia sulphate, imported, 485.
- Rabe contact process, 409.
- Rails, iron and steel, used as material, 13, 52, 78; produced, 52, 53, 54.
- Railways, marine, 345, 346. *See also* Electric railways and Shipbuilding.
- Rauh, E., Sons Fertilizer Co., chamber process plant, 411.
- Reading, Pa., statistics of automobile manufacture, 274.
- Reapers, 136, 137, 144, 150.
- Red prussiate of potash, imported, 434.
- Reese, Dr. Charles L., manufacture of nitroglycerin, 471, 472.
- Refineries, petroleum, 567.
- Refrigerator industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Regalia and society banners and emblems industry, establishments, wage-earners, and earnings, 720, 728, 738.
- Repairs and repair shops, statistics, shipbuilding, 343, 344, 348, 350; steam railroad, 362, 368, 370, 374, 378, 382; street railroad, 386, 388, 390.
- Repauno Chemical Co., contact process plant, 410.
- Residium, produced, 570-573, 575, 581, 582.
- Resistances, dimmer, construction, and use in theaters, 209. *See also* Rheostats and resistances.
- Rheostats and resistances, statistics, 208-210.
- Rhode Island, rank in production of electrical machinery and appliances, 204; women wage-earners, 680.
- Rice cleaning and polishing industry, establishments, wage-earners, and earnings, 649, 720, 728, 738.
- Richmond Guano Co., chamber process plant, 411.
- Rio Tinto mine, Spain, pyrites from, 407.
- Road carts and wagons, 137, 144, 150, 312, 318, 324.
- Roberts Chemical Co., manufacture of caustic potash, 427.
- Rockaways, 312, 313, 324.
- Rocky Mountain division, discussion relative to industries, wage-earners, and earnings, 701-703. *See also* Geographic divisions.
- Roehling iron and steel works, electric induction furnace used, 24.
- Rohrman and Lunge, plate towers for acid condensation, 413, 418.
- Rollers, 136, 137, 144, 150.
- Rolling mills, establishments and products, 3, 59, 60, 80, 82.
- Roofing materials industry, establishments, wage-earners, and earnings, 649, 722, 730, 738.
- Rowland, Prof. H. A., printing telegraph system, 200, 201.
- Royster, F. S., Guano Co., chamber process plant, 411.
- Rubber, use in insulating material, 205, 206.
- Rubber and elastic goods industry, 275, 722, 730, 774, 780.
- Rubber boot and shoe industry, establishments, wage-earners, and earnings, 716, 724, 732.
- Rubber substitutes, produced, 475.
- Rubber tires. *See* Tires, rubber.
- Rules, ivory and wood, establishments, wage-earners, and earnings, 649, 722, 730, 738.
- Runabouts, 272, 273, 312, 314, 318, 320, 324, 326.
- Russia, agricultural implement exports to, 139.
- Saddlery and harness industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Safe and vault industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Safety explosives, development of industry, 473.
- Safflower and extract of saffron and saffron cake, imported, 457.
- Sail vessels, discussion, 341. *See also* Shipbuilding.
- Sal soda, produced, 401, 421, 507; imported, 425.
- Salaries officials, clerks, etc., number and salaries in establishments engaged in specified industries, iron and steel, 4-6, 16, 18, 19; blast furnaces, 25, 27, 41, 42, 46, 72; steel works and rolling mills, 49, 50, 76; forges and bloomeries, 70; tin andterne plate, 87, 89-91, 94-96; copper, lead, and zinc, smelting and refining, 101, 103, 105, 107, 110, 112-115, 119, 121-125; agricultural implements, 129, 131, 132, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 275, 282; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-303, 310, 316, 322; shipbuilding, 331, 332, 334, 335, 348, 350, 352; steam and street railroad cars, 357, 358, 364, 365, 367, 368-370, 371, 374, 378, 382, 386, 389, 390; chemicals and allied products, 398, 399; acids, 404, 417, 504; sodas, 421; alums, 428; coal tar products, 430; cyanides, 432; wood distillation 435, 505; fertilizers, 438, 494; bleaching materials, 441; electrochemicals, 444; dyestuffs, 450, 502; tanning materials, 458; paints and varnishes, 461, 463, 492, 500; explosives, 468, 470, 498; plastics, 475, 476; essential oils, 477, 506; gases, compressed and liquefied, 479; chemicals, 482, 486, 490; bone, ivory, and lamp black, 507; coke, 515, 528; petroleum refining, 567, 574.
- Salicylic acid, imported, 419.
- Salt, use in soda industry, 420-423; used as material, 400, 440, 442, 451, 487, 507; process of decomposing, 442.
- Salt cake, produced, 486; imported, 489.
- Salt industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Saltpeter, produced, 486; crude, imports, 488; used as material, 509.
- San Domingo, Portugal, source of pyrites supply, 407.
- Saratoga Springs, N. Y., carbon dioxide production, 480, 481.
- Sassafras oil, produced, 477, 512. *See also* Oils, essential.
- Sausage industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Saw industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sawing machines, produced, 227, 231.
- Sawmills, portable, 137, 144, 150.
- Sayles Bleacheries, chamber process plant, 411.
- Scales and balances industry, establishments, wage-earners, and earnings, 649, 722, 730, 738.
- Schatterbeck, on arsenic sulphide waste, 409.
- Schoellkopf, J. F., on development of the coal tar industry, 453-455.
- Schroeder process, sulphuric acid extraction, 409, 410.
- Scott Bros. Fertilizer Co., chamber process plant, 411.
- Scrap bar. *See* Muck and scrap bar.
- Scrap iron and steel, used as material, 13, 44, 52, 71, 78, 89, 95.
- Screw machines, importance of magazine attachment, 234.
- Screws, machine and wood, industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Scythe snaths, 136, 144, 150.
- Scythes, 135, 136, 144, 150.
- Searchlights and projectors, produced, 183.
- Seattle-Tacoma Power Co., plant, 631, 634.
- Seed separators, 135-138, 144, 150.

- Seed sowers, 136, 142, 148.
- Seeders and planters, 135-138, 142, 148.
- Semet-Solvay, by-product oven. *See* Ovens.
- Serpollet, Leon, application of steam to road vehicles, 277, 278.
- Sewing machine cases industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sewing machines and attachments industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Shawinigan Water and Power Co., plant, 634.
- Sheet zinc, produced, 125, 126.
- Shepard, T. P., & Co., chamber process plant, 411.
- Shipbuilding industry, discussion relating to branches, production, and development, 331-353; by branches, 332, 333; materials used, 333; products, 333, 334; by watershed districts, 334; Governmental establishments, 335; private vessels launched, small boats, and repair work, 335-339; steam and other power vessels, 340, 341; sail vessels, 341; canal boats, 341, 342; small boats, 342; repair work, 343; equipment of shipyards, 343; dry docks, 344; marine railways, 345, 346; power, 347; detailed summary, 347-353; establishments, wage-earners, and earnings, 722, 730, 738; by specified states, 780.
- Ships, changes in construction, 331.
- Shipyards, Government, 335; vessels launched during 1904, 337; value of repair work, 343; dry docks, 345.
- Shipyards, private, vessels launched during 1904, 336-341; value of repair work, 343, 344; dry docks, 344, 345.
- Shirt industry, establishments, wage-earners, and earnings, 651, 722, 730, 738; by states, territories, and geographic divisions, 770; by specified states, 780, 786.
- Shoddy industry, establishments, wage-earners, and earnings, 649, 722, 730, 738.
- Shoe tacks and shoe nails. *See* Nails.
- Shoes, horse and mule, produced, 60.
- Shovels, spades, and scoops, agricultural, 137, 144, 150.
- Show case industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sickles, 144, 150.
- Siemens Bros., resistance rods, patent, 448.
- Siemens-Halske Co., Germany, tantalum lamps, 185.
- Signal Corps, United States, adoption of telautograph, 202; submarine cables created, 206.
- Signals, telephone, electromagnetic, 193, 194; incandescent lamp, 194; submarine, 199.
- Silicon, metallic, production, 23.
- Silk, artificial, industry, development, 476, 477.
- Silk and silk goods industry, power, 621-624; establishments, wage-earners, and earnings, 651, 722, 730, 738; by states, territories, and geographic divisions, 770; by specified states, 774, 784, 786, 788.
- Silver, product, copper and lead smelting and refining industry, 102; copper smelting and refining, 105, 107-110, 112, 113; lead smelting and refining, 115, 117-122; establishments reporting gross and net values, 120; imports and exports, 122; use as material in fine chemicals, 484.
- Silver salts, produced, 402, 482, 508.
- Silversmithing and silverware industry, establishments, wage-earners, and earnings, 722, 730, 738; by specified states, 788.
- Single phase alternating current dynamos, uses, 162.
- Single phase motor equipment, description, 171.
- Single phase induction motors. *See* Electric motors.
- Singletrees, agricultural, 137, 144, 150.
- Sirup evaporators, 137, 144, 150.
- Siskiyou Electric Power Co., plant, 634.
- Sizes, dyestuffs, produced, 451, 511.
- Skelp, iron and steel, used as material, 13, 78; produced, 52, 53, 55.
- Slack. *See* Bituminous coal and slack.
- Slag pits, number and capacity, 40.
- Slaughterhouse fertilizing materials, grades, 441.
- Slaughtering and meat packing industry, establishments, wage-earners, and earnings, 722, 730, 738; by specified states, 776.
- Sleds. *See* Sleighs and sleds.
- Sleeping cars, built, 366.
- Sleighs and sleds, 304-306, 312, 314, 318, 320, 324, 326.
- Slotters and shapers, 227, 230.
- Sludge acid. *See* Acid, sludge.
- Smelter smoke, industrial value, 408.
- Smelting and refining industry, establishments, wage-earners, and earnings, 722, 730, 738. *See also* Copper, lead, and zinc, smelting and refining.
- Smelting furnaces, electric, number in United States and Canada, 450.
- Smokeless powder, produced, 402, 468, 509; classes and process of manufacture, 472, 473.
- Soap industry, quantity of sodas used, 424; potash or pearlash, 427; establishments, wage-earners, and earnings, 722, 730, 738.
- Soda alum, produced, 429.
- Soda ash, produced, 401, 421, 507; imported, 425; used as material, 442, 451, 487.
- Soda water apparatus industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sodas, produced, 401, 421, 507, 509; discussion relating to classes, production, and uses, 420-425; summary, 421; establishments, by states, 422; the world's production, 423; imports, 425, 485, 489; used as material, 509, 512.
- Sodium, value as copper substitute in electric conductors, 449, 450; used as material, 507.
- Sodium cyanide, produced, 436.
- Sodium dioxide, Harold J. Turner on utilization, 443.
- Sodium phosphates, produced, 402.
- Solvay, Ernest, process of soda production, 421, 422.
- Solvay Process Co., ammonia-soda process in use, 422.
- Sorghum evaporators, 137, 144, 150.
- Sounding boards and bridges, piano, used as material, 250.
- South America, exports to, automobiles and automobile parts, 276; carriages and wagons, 307; steam railroad cars and parts, 367.
- Southern North Atlantic division, discussion relative to industries, wage-earners, and earnings, 683-685. *See also* Geographic divisions.
- Southern South Atlantic division, discussion relative to industries, wage-earners, and earnings, 688-690. *See also* Geographic divisions.
- Southern states, iron and steel industry in, 22; development of power, 626.
- Southern States Fertilizer Co., chamber process plant, 411.
- Southwest Chemical Co., chamber process plant, 411.
- Spain, pyrites imported into United States from, 407.
- Speed adjustment devices for metal working machinery, 232, 233.
- Spelter, produced, 122, 124-126.
- Sphalerite, formula, 407; value as a sulphuric acid producer, 408.
- Spiders, four-wheeled, 312, 318, 324.
- Spiegeleisen, produced, 30, 33, 35, 74. *See also* Pig iron.
- Spikes. *See* Nails.
- Splice bars, produced, 53, 54.
- Sporting goods industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Spring River Power Co., plant, 634.
- Springs, iron and steel, produced, and states reporting, 60.
- Springs, steel, car, and carriage industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sprinklers, street, 312, 318, 324.
- Stackers, agricultural, 136, 144, 150.
- Stacks, increase in number and capacity, 37, 39, 40.
- Stalk cutters, 136, 144, 150.
- Stamford, Conn., rank in manufacture of piano materials, 250, 251.
- Stamped ware industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Stamping, flanging, and forming machines, produced, 227, 228.
- Standard Chemical and Oil Co., chamber process plant, 411.
- Stanhopes, automobiles, 272, 278; carriages, 312, 318, 324.
- Starch, used as a material, 451.
- Starch industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Stassano electric furnace, 22, 23.
- Stassfurt, Germany, potash salt works, 426.
- Statuary and art goods industry, establishments, wage-earners, and earnings, 649, 722, 730, 738.

- Steam and street railroad cars. *See* Cars.
- Steam engines, portable, 137, 144, 150.
- Steam fitting and heating apparatus industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Steam packing industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Steam turbines, description and uses, 163, 164.
- Steampower, statistics of, 627. *See also* Power.
- Steel, Bessemer. *See* Bessemer steel.
- Steel, open-hearth. *See* Open-hearth steel.
- Steel production, statistics, 61-70, 76-83. *See also* Iron and steel industry.
- Steel vessels. *See* Vessels, iron and steel, and wooden.
- Steel works and rolling mills, establishments, 8, 14, 49, 51; wage-earners, 11, 49; fuel consumed, 12; iron ore consumed, 13; products, 14, 49, 52-60; discussion of statistics, 48-70; summaries, 49, 53, 76-83; materials used, 51, 52; equipment, 60, 61; steel production, 61-70.
- Steel works and rolling mills and forges and bloomeries, summary, 19; by geographic divisions, 20.
- Stencil and brand industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Stereotyping and electrotyping industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Sterling White Lead Co., manufacturing process, 463.
- Still, 568, 575, 578.
- Stock cars, built, 366.
- Stolberg, Germany, sulphuric acid furnace, 408.
- Storage batteries. *See* Batteries, storage and primary.
- Stove and furnace industry, establishments, wage-earners, and earnings, 722, 730, 738, 782, 786.
- Stove industry, gas and oil, establishments, wage-earners, and earnings, 722, 730, 738.
- Stoves, electric. *See* Electric heating apparatus.
- "Straightaway" switchboard, 175.
- Straw goods, not elsewhere specified, establishments, wage-earners, and earnings, 722, 730, 738.
- Straw stackers, 137, 144, 150.
- Structural ironwork industry, establishments, wage-earners, and earnings, 722, 730, 738, 786, 788.
- Strychnia, imported, 485.
- Submarine cables, insulation, 205; Philippine Islands and Alaska, 206.
- Sugar and molasses refining industry, establishments, wage-earners, and earnings, 722, 730, 738, 778.
- Sulkies, 312, 318, 324.
- Sulphur, production, 400-409; imports, 407, 489; used as material, 440-442, 451, 470, 487, 507, 511, 575.
- Sulphuric, nitric, and mixed acids industry, discussion, 403-417; detailed summary, 511; establishments, wage-earners, and earnings, 722, 730, 738.
- Sulphuric acid, used as materials, 89, 91, 97, 400, 403, 411, 440, 451, 470, 480, 484, 487, 507, 508, 509, 511, 575; production, 125, 401, 403-410; establishments, wage-earners, and earnings, 404, 405; imports, 407, 419; plants, 410, 411.
- Sumac, imported, 460; leaves, used as material, 511; extract produced, 511.
- Superphosphates. *See* Fertilizers.
- Surgical appliances industry, establishments, wage-earners, and earnings, 722, 730, 738.
- Surreys, 272, 273, 312, 314, 318, 320, 324, 326.
- Swank, J. M., on fuel for iron smelting, 540.
- Swedish billets. *See* Iron and steel industry, materials used.
- Sweepers, street, 312, 318, 324.
- Switchboards, for light and power, 174-176. *See also* Telephone switchboards.
- Synchronous alternating current motors. *See* Motors, electric.
- Tack plates, states reporting, 55.
- Tacks and small nails. *See* Nails.
- Taggers tin, production, imports, exports, and consumption, 92.
- Tallow and fats, used as material, 400, 507.
- Tallyhos, 312, 318, 324.
- Tandems, 312, 318, 324.
- Tanks, storage, used in petroleum refining industry, 570, 575.
- Tannage, chrome, Frank Hall Thorp on process, 459.
- Tannic acid, imports consumed, 419; produced, 511.
- Tanning materials, natural and artificial extracts produced, 402, 458; discussion, 457-460; establishments manufacturing, 458; imports and exports, 460.
- Tantalum, use and chemical properties, 185.
- Tapley, W. H., on advantages of electric motors in printing press work, 170.
- Tar, produced, 436, 523; description and uses, 540, 541; oil, 436. *See also* Coal tar.
- Tartar, cream, produced, 402, 486, 508; imports, 488.
- Tartaric acid, produced, 401, 507; imports consumed, 419.
- Telautograph, description and uses, 202.
- Telegraph apparatus, discussion relative to, 200-204.
- Telegraph switchboards, parts and supplies, 200.
- Telegraph systems, printing, description of, 200-202; Rowland, 200; Murray, Buckingham, and Barclay, 201; Delany, 201, 202; writing, development of, 202; wireless, value of apparatus, 200; uses and descriptions, 202-204.
- Telegraphone, Poulsen, description and uses, 198-200.
- Telephone and telegraph system, census of, 157.
- Telephone apparatus, development of industry, 159, 160; statistics of production and use, 191-200; parts and supplies, transmitters, receivers, and other instruments, 192, 196; utilization in rural districts, 193; description, 196, 197; induction coils, construction, 196, 197; use for transmission of music, sermons, speeches, etc., 198; exchanges, importance of lighting arrester equipment, 212.
- Telephone switchboards, 192, 193, 194; common battery, 194; automatic, 194, 195; cost of construction, 195; private exchanges, 196.
- Telluride Power Transmission Co., plant, 634.
- Tennessee, ferrophosphorus, production, 30; rank in value of tanning materials produced, 458.
- Tennessee Copper Co. plant, 408.
- Terne plate, imports, exports, and consumption, 92; produced, 92, 97.
- Terrenoire Co., coke ovens, 534.
- Tetrachloride, carbon. *See* Carbon, tetrachloride.
- Textile fabrics, use in interior electric conduits, 207.
- Tharsis mine, Spain, source of pyrites supply, 407.
- Thomson, Edgar, works, installation of compound motors for rolling rails, 169.
- Thomson, J. M. and W. T., process of manufacture of cellulose nitrate, 472.
- Thorp, description of cryolite process of soda manufacture, 423.
- Thorp, Frank Hall, on chrome tannage, 459.
- Thrasher trucks, 137, 144, 150.
- Thrashers, horsepower and steampower, 135, 136, 144, 150.
- Tilt Cove mines, Newfoundland, source of pyrites supply, 407.
- Tin, used as material, 487.
- Tin and terne dipping and black plate combined industry, discussion, 87, 88; establishments and summaries, 87-90; materials used, 89; products, 90; idle establishments, 97; earnings of children in, 649; establishments, wage-earners, and earnings, 722, 730, 740.
- Tin and terne dipping industry, establishments, materials used, 90, 91; products, 92; daily capacity of establishments, 93.
- Tin compounds, products, 486, 487.
- Tin plate, imports, exports, and consumption of, 92; production, 92, 97.
- Tin plate, terne plate, and taggers tin, importation and consumption, 92.
- Tin salts, produced, 402, 507.
- Tinfoil industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Tinware industry, establishments, wage-earners, and earnings, 722, 730, 740, 780.
- Tires, rubber, 304, 310, 316, 322.
- Titanium Manufacturing Co., production of ferrotitanium, 23.
- Tobacco, chewing and smoking, and snuff, industry, establishments, wage-earners, and earnings, 649, 722, 730, 740; by specified states, 778, 786, 790.
- Tobacco, cigars and cigarettes, industry, establishments, wage-earners, and earnings, 651, 666-669, 722, 730, 740; by states, territories, and geographic divisions, 770; by specified states, 774-790.

- Tobacco transplanters, 136, 142, 148.
- Tonnage, method of obtaining, 335, 336.
- Tools, not elsewhere specified, establishments, wage-earners, and earnings, 722, 734, 740.
- Touring cars, automobile, 272, 273.
- Townsend, Clinton P., invention of cell for electrolysis of alkali chlorides, 449.
- Toy and game industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Traction engines, agricultural, 137, 144, 150.
- Transformers, production and use, 173, 174.
- Traps, four-wheeled, 312, 318, 324.
- Tricycles. *See* Bicycles and tricycles.
- Tropenas and converters, other than Bessemer, 65.
- Trucks, business, 312, 318, 324.
- Trunk and valise industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Tungsten, use, properties, fundamental and commercial value and processes for utilization, 186, 187.
- Turbines, steam, description, 164, 628-631.
- Turbo-generators, economic and engineering, 163; types, uses, and average capacity, 164, 165.
- Turkey red oil, products, 511.
- Turner, Harold J., on utilization of sodium dioxide, 443.
- Turpentine, used as material, 463.
- Turpentine and rosin industry, establishments, wage-earners, and earnings, 649, 690, 722, 730, 740; by specified states, 776.
- Turpentine spirits, produced, 436.
- Two-wheeled vehicles, 312, 318, 324.
- Type founding industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Typewriters and supplies industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Umbrella and cane industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Union Carbide Co., calcium carbide production, 445, 448.
- Union Iron Works, steel cruisers built, 337.
- United Kingdom, exports to, 139, 307.
- United States, Navy, steel vessels launched, 337; Army, adoption of nitrocellulose powder, 472.
- United States Geological Survey, inspection of explosives in mines, 475.
- United States Naval Smokeless Powder Factory, rebuilding mixed acids, 416.
- United States Signal Corps, adoption of tel-autograph, 202; submarine cables created, 206.
- United Zinc and Chemical Co., contact process plant, 410.
- Upholstering material industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Utah Sugar Co., electrical transmission plant, 634.
- Vacuum tubes and lamps, description, 187-190.
- Valentiner vacuum process of nitric acid distillation, 413; results obtained, 414.
- Valentinus, Basilius, sulphur used to produce sulphuric acid, 407; muriatic acid preparation described, 417.
- Vanadate of iron, produced, 23.
- Vanadium Alloys Co., reduction works, 23.
- Vanillin, produced, 482, 508.
- Varnish, pyroxylin, composition and uses, 467; industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Varnished cambric, use in cable insulation, 205.
- Varnishes, oil and turpentine, produced, 402, 461, 508, 510; processes of manufacture, 466, 467.
- Varnishes and japans, produced and consumed, 508, 510.
- Vaseline, method of obtaining, 581.
- Vault light and ventilators industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Veatch, Dr. John A., discovery of borax by, 424.
- Vermilion, process of production, 465.
- Vertical turbo-generators. *See* Turbo-generators.
- Vessels, iron and steel, and wooden, summaries, 332, 334, 335; products, 333; launched by private shipyards, 336, 337, 339, 340; for United States Navy, 337; steam and other power, 340; sail, launched by private shipyards, 341. *See also* Shipbuilding industry.
- Victoria automobiles, 272, 273.
- Victorias, pleasure carriages, 312, 318, 324.
- Vinegar and cider industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Virginia, progress in shipbuilding industry, 334; rank in manufacture of tanning materials, 458.
- Virginia-Carolina Chemical Co., chamber process plant, 411.
- Virginia Electrolytic Co., production of ferroalloys, 23.
- Virginia State Fertilizer Co., chamber process plant, 411.
- Vis-a-vis, pleasure carriages, 312, 318, 324.
- Viscose, invention of, 477.
- Vitriol, blue. *See* Blue vitriol.
- Vocalion, description of, 246.
- Wage-earners and wages, in specified industries, iron and steel, 4-6, 11, 16, 18, 19; blast furnaces, 25, 27, 41, 42, 46, 72; steel works and rolling mills, 49-50, 76-78; forges and bloomeries, 70; tin andterne plate, 87, 89-91, 94-96; copper, lead and zinc, smelting and refining, 101, 103, 105, 107, 110-115, 119, 121-124, 126; agricultural implements, 129, 131-132, 142, 148; electrical machinery, 158, 159, 218; musical instruments, 239-241, 252, 256, 258, 260, 264, 266; automobiles, 269, 270, 273, 275, 282; bicycles and tricycles, 289, 291, 294; carriages and wagons, 301-303, 307, 310, 316, 322; shipbuilding, 331, 332, 334, 335, 348, 350, 352; steam and street railroad cars, 357, 358, 364, 365, 367-371, 374, 378, 382, 386, 388-390; chemicals and allied products, 398, 399; acids, 404, 417, 504; sodas, 421; alums, 428; coal tar products, 430; cyanides, 432; wood distillation, 435, 505; fertilizers, 438, 496; bleaching materials, 441; electro-chemicals, 444; dyestuffs and extracts, 450, 502; tanning materials, 458; paints and varnishes, 461, 463, 492-495, 500; explosives, 468, 470, 498; plastics, 475, 476; essential oils, 477, 506; gases, compressed and liquefied, 479; chemicals, 482, 486, 490; bone, ivory, and lampblack, 507; coke, 515, 528; petroleum refining, 567, 574.
- Wagon bodies, used as material, 304.
- Wagons, business, farm, government, municipal, etc., 304-306, 312, 318, 324.
- Wagons and wagon trucks, agricultural, 137, 144, 150.
- Wall paper industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Waltham Abbey Factory, England, process of cellulose nitrate manufacture used, 472.
- Washing machine and clothes wringer industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Washington Water Power Co., plant, 634.
- Watch and clock material industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Watch case industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Watch industry, establishments, wage-earners, and earnings, 649, 722, 730, 740.
- Water motors, number and horsepower, establishments, 620.
- Water paints, dry or in paste, produced, 508, 641.
- Water paints and kalsomine, produced, 508.
- Waterpower, establishments using, 40; discussion, 629-631; industries reporting, 631; utilization, 635.
- Water trucks, agricultural, 137, 144, 150.
- Water wheels, number and horsepower, 619, 620.
- Watt hour meters, construction, 214; women employed in manufacture, 214.
- Wax, paraffin, average value per barrel, 570; increase in quantity, 571.
- Webb, Herbert Laws, on the advantages of incandescent lamp signals in telephonic practice, 194.
- Weeders, 144, 150.
- Weeks ovens. *See* Ovens.
- West Indies, exports to, of automobiles and automobile parts, 276; steam railroad, passenger, and freight cars, and parts of same, 367.
- West Virginia, rank in value of iron and steel products, 6, 8; use of natural gas as fuel, 52; production of nail plate, 55; skelp, 55; iron black plates, 56.
- Western Chemical Co., chamber process plant, 411.
- Western division, sulphuric acid produced, 406.
- Western North Central division, discussion relative to industries, wage-earners, and

- earnings, 693-697. *See also* Geographic divisions.
- Western South Central division, discussion relative to industries, wage-earners, and earnings, 699-701. *See also* Geographic divisions.
- Western states, iron and steel industry, 22.
- Western Union Telegraph system, offices equipped and remodeled, 200.
- Wheatstone automatic transmitter, use in printing telegraphy, 201.
- Wheelbarrow industry, establishments, wage-earners, and earnings, 649, 722, 730, 740.
- Wheels, used as material, 304.
- Whip industry, establishments, wage-earners, and earnings, 722, 730, 740.
- White lead, dry, produced, 402, 461, 508, 510; consumed in establishments where manufactured, 403; in oil, produced, 461, 508, 510; ancient uses of, 463; used as material, 463, 508, 510; English process of manufacturing, 464.
- Whiting, used as material, 463.
- Whitney Reduction Co., plant, 634.
- Wilke, on Mannheim process sulphuric acid extraction, 410.
- Willson Aluminum Co., production of ferro-alloys, 22.
- Windmill industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Windmills, 137, 144, 150.
- Window shades and fixtures, industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Wine lees, imports, 488.
- Winnipeg General Power Co., plant, 634.
- Wintergreen oil, produced, 477, 512.
- Wire, rods, used as material, 13, 78; products, 52-54, 57-60; cordage, ship and boat building, 348, 350.
- Wire and wirework industries, establishments, wage-earners, and earnings, 722, 730, 740.
- Wireless telegraph, apparatus, value, 200. *See also* Telegraph systems.
- Wisconsin, rank in value of iron and steel products, 7, 8; in waterpower used, 629.
- Witch hazel, produced, 402; extract, 477, 512.
- Wood, used as material, 244, 400, 470, 509, 511, 512; fiber, use in soda manufacture, 424; preserving industry, establishments, wage-earners, and earnings, 722, 730, 740; turned and carved, establishments, wage-earners, and earnings, 722, 730, 740.
- Wood alcohol, refined, produced, 401, 437, 512; crude, 435; pine, 436; exported, 437; used as material, 512.
- Wood ashes, used as material, 400, 440, 507, 509.
- Wood carpet industry, establishments, wage-earners, and earnings, 649, 722, 730, 740.
- Wood distillation, discussion relating to classes, production, and development of industry, 434-437; by states, 505, 512; establishments, wage-earners, and earnings, 722, 730, 740.
- Wooden vessels. *See* Vessels, iron and steel, and wooden.
- Wooden ware (not elsewhere specified), establishments, wage-earners, and earnings, 722, 730, 740.
- Wool pulling industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Wool scouring industry, establishments, wage-earners, and earnings, 722, 730, 740.
- Woolen goods industry, power used, 621, 622, 623, 624, 628; establishments, wage-earners, and earnings, 651, 722, 730, 740; by states, territories, and geographic divisions, 722; by specified states, 774, 780, 784, 788, 790.
- Women, children, and negroes, employed in North and South Carolina, effect on earnings, 678.
- Worcester, William F., section on Musical instruments, attachments, and materials, 239.
- Worsted goods industry, increase in consumption of horsepower, 620; power used, 621, 622, 623, 624; size of steam engines employed, 628; establishments, wage-earners, and earnings, 651, 722, 730, 740; by states, territories, and geographic divisions, 772; by specified states, 780, 784, 788.
- Writing telegraph systems. *See* Telegraph systems.
- Wyoming, children employed as wage-earners, 680.
- X-ray bulbs, use in surgical operations, 187.
- Yellow metal, including bolts and spikes, used in shipbuilding, 348, 350-353.
- Yellow prussiate of potash, imported, 434; produced, 507.
- Zinc and zinc dross, used as material, 487.
- Zinc lead, Joseph H. Pratt quoted in regard to production and value, 464.
- Zinc oxide, produced, 125; used as material, 476.
- Zinc salts, produced, 486.
- Zinc smelting, comparative summaries, 101, 123, 124; idle establishments, 122; products, 122-125; detailed summary, 125, 126.
- Zinc white, used as material, 463, 508, 510; methods of production, 465.
- Zirconium, use of, 186.